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GRADE 'A' PASTEURIZED MILK ORDINANCE. 1965 RECOMMENDATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE

Public Health Service
Washington, D. C.

1965

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GRADE "A" PASTEURIZED MILK ORDINANCE

1965 Recommendations of the United States Public Health Service

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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FOREWORD

The milk sanitation program of the United States Public Health Service is one of its oldest and most respected activities. The interest of the Public Health Service in milk sanitation stems from two important public health considerations. First, of all foods, none surpasses milk as a single source of those dietary elements needed for the maintenance of proper health—especially in children and older citizens. For this reason, the Service has for many years promoted increased milk consumption. Second, milk has a potential to serve as a carrier of disease and has, in the past, been associated with disease outbreaks of major proportions.

The incidence of milkborne illness in the United States has been sharply reduced in recent years. In 1938, milkborne outbreaks constituted 25 percent of all disease outbreaks due to infected foods and contaminated water. Our most recent information reveals that milk and fluid milk products are associated with only 2½ percent of such reported outbreaks. Many groups have contributed to this commendable achievement, including public health and agricultural agencies, the dairy and related industries, the several interested professional groups, educational institutions, and the consuming public. The Public Health Service is proud to have contributed to the protection and improvement of the milk supply of the Nation through technical assistance, training, research, standards development, evaluation, and certification activities.

Despite the progress that has been made, occasional milkborne outbreaks of illness still occur, emphasizing the need for continued vigilance at every stage of production, processing, pasteurization, and distribution of milk and milk products. During the past decade, problems associated with the sanitary control of milk and milk products have become extremely complex because of new products, new processes, new chemicals, new materials, and new marketing patterns, which must be evaluated in terms of their public health significance. The *Grade A Pasteurized Milk Ordinance—1965 Recommendations of the United States Public Health Service* translates this new knowledge and technology into effective and practicable public health practices.

The responsibility for insuring the ready availability and safety of milk and milk products is not confined to an individual community or a State, or to the Federal Government—it is the concern of the entire Nation. With the continued cooperation of all interested groups, both Government and industry, engaged in the sanitary control of milk and milk products, such responsibility can be accepted with confidence.

WESLEY E. GILBERTSON,
Chief, Division of
Environmental Engineering and Food Protection.

PREFACE

The activities of the Public Health Service in milk sanitation began at the turn of the century with studies on the role of milk in the spread of disease. This work led to the conclusion that effective public health control of milkborne disease requires the application of sanitation measures throughout the production, handling, pasteurization, and distribution of milk. These early studies were followed by research to identify and evaluate sanitary measures which might be used to control disease, including studies which led to improvement of the pasteurization process.

To assist States and municipalities in initiating and maintaining effective programs for prevention of milkborne disease, the Public Health Service in 1924 developed a model regulation, known as the "*Standard Milk Ordinance*," for voluntary adoption by State and local milk control agencies. To provide for uniform interpretation of this *Ordinance*, an accompanying *Code* was published in 1927 which provided administrative and technical details as to satisfactory compliance. This model milk regulation, now titled the *Grade A Pasteurized Milk Ordinance—1965 Recommendations of the United States Public Health Service*, represents the 13th revision since 1924 and incorporates new knowledge into public health practice.

The *Grade A Pasteurized Milk Ordinance* was not produced by the Public Health Service alone. As with every preceding edition, it was developed with the assistance of milk sanitation and regulatory agencies in every level of Federal, State, and local government including both health and agriculture departments; all segments of the dairy industry including producers, plant operators, equipment manufacturers, and associations; many educational and research institutions; and with helpful comments from many individual sanitarians, citizens, doctors, lawyers, and legislators. More than 5,000 separate and constructive recommendations were received after the Public Health Service requested critical review of nearly 3,000 widely distributed prepublication draft copies. Most careful consideration was given to every comment submitted.

A panel of 12 experienced milk sanitation specialists, representing particular competencies in the fields of milk production, processing, administration, education, and technology, assisted the Public Health

Service in evaluating the literally thousands of recommendations relating to the revision of the *Milk Ordinance and Code—1953 Recommendations of the Public Health Service.* The counsel and guidance rendered by these authorities in the preparation of this edition of the *Pasteurized Milk Ordinance* are deeply appreciated. The panel consisted of the following members:

Harold J. Barnum, Denver City-County Department of Health and Hospitals, Denver, Colo.

George Bauer, Department of Public Health and Welfare, Springfield, Mo.

Paul Corash, Metropolitan Dairy Institute, Inc., New York, N.Y.

William A. Dean, Jr., Bowman Dairy Co., Chicago, Ill.

G. A. Houran, The DeLaval Separator Co., Poughkeepsie, N.Y.

Shelby Johnson, Kentucky State Department of Health, Frankfort, Ky.

Robert W. Metzger, D.V.M., Dairymen's League Co-operative Association, Inc., Syracuse, N.Y.

Alfred E. Reynolds, California State Department of Agriculture, Sacramento, Calif.

Elbrege D. Sullivan, Central Oklahoma Milk Producer's Association, Lawton, Okla.

Clinton Van Devender, Mississippi State Board of Health, Jackson, Miss.

H. H. Vaux, Indiana State Board of Health, Indianapolis, Ind.

K. G. Weckel, Ph. D., The University of Wisconsin, Madison, Wis.

As of December 1964, the *Milk Ordinance* recommended by the Public Health Service (1953 edition) was the basis of the milk sanitation law or regulations of 37 States. Its provisions have been voluntarily adopted by 1,435 municipalities and 512 counties located in 40 States. Included are 71 cities of over 100,000 population and 72 cities with population between 50,000 and 100,000. Almost 110 million people in this country live in jurisdictions utilizing the provisions of the Public Health Service recommended *Milk Ordinance.*

The Public Health Service recommended *Milk Ordinance* is the basic standard used in the voluntary Cooperative State-PHS Program for Certification of Interstate Milk Shippers. It is incorporated by reference in Federal specifications for procurement of milk and milk products; is used as the sanitary regulation for milk and milk products served on interstate carriers; and is recognized by the public health agencies, the milk industry, and many others as a national standard for milk sanitation.

The *Grade A Pasteurized Milk Ordinance—1965 Recommendations of the United States Public Health Service*, adopted and uniformly applied, will continue to provide effective public health protection without being unduly burdensome to either regulatory agencies or the dairy industry. It represents a "grass-roots" concensus of current knowledge and experiences and as such represents a practical and equitable milk sanitation standard for the Nation.

EDWIN L. RUPPERT,
Chief, Milk and Food Branch,
Division of Environmental Engineering
and Food Protection.

INTRODUCTION

The following *Pasteurized Milk Ordinance*, with Appendixes, is recommended for legal adoption by States, counties, and municipalities, in order to encourage a greater uniformity and a higher level of excellence of milk sanitation practice in the United States. An important purpose of this recommended standard is to facilitate the shipment and acceptance of milk and milk products of high sanitary quality in interstate and intrastate commerce.

This edition of the *Ordinance* contains sanitary standards for Grade A pasteurized milk and milk products only.

Outline of Contents.—As shown by the table of contents, the publication consists of two parts and the appendixes.

Part I is the unabridged form of the *Ordinance*, arranged and presented in a form which can be adopted as an ordinance or as any other legal instrument. Section I defines milk and those milk products which are to be controlled under it. Communities desiring to regulate cottage cheese and creamed cottage cheese under the terms of this *Ordinance* can optionally insert these products in this section as defined in footnote 4. Section I also specifies those milks and milk products which are not intended to be regulated under this *Ordinance*, such as ice cream, evaporated milk, sterile milk and milk products, butter, etc. Section 7 establishes the sanitation standards for Grade A milk and milk products and specifies, as well, the chemical, bacteriological, and temperature requirements thereof. Section 11 regulates milk and milk products received from points beyond the limits of routine inspection and supervision. Sections 8 and 13 include requirements relating to animal health and personal health, respectively. The other sections are largely concerned with various phases of administration and enforcement of the *Ordinance;* e.g., permits, labeling, inspection, laboratory examinations, future construction, etc.

Part II contains the *Ordinance*, together with administrative procedures which are designed to unify the interpretation of the *Ordinance* and, particularly in the case of the sanitation requirements contained therein, provide details as to methods of satisfactory compliance. It will be noted that Section 15 of the *Pasteurized Milk Ordinance* provide that enforcement of the *Ordinance* shall be in accordance with the administrative procedures contained in Part II thereof.

The *Appendixes* are 12 in number, containing detailed, explanatory material on various aspects of milk sanitation technology and administration—e.g., individual water supply and sewage disposal system standards; pasteurization equipment specifications and tests; industry dairy farm inspector certification procedures; milk production methods; examples of inspection and ledger forms, etc. Where mandatory compliance with specific provisions of the appendixes is referenced in the *Pasteurized Milk Ordinance*, such provisions shall be deemed a legal requirement of the *Ordinance*.

Appendix K contains the adoption-by-reference form of the recommended *Pasteurized Milk Ordinance*. The short form reduces the cost of publishing and printing and helps to keep the *Ordinance* up to date, since it is readily amendable. It is suggested for adoption in those jurisdictions where adoption of ordinances by reference to published standards is considered legal.

Legal Aspects.—Recommendations concerning legal aspects have been suggested from time to time by the Office of the General Counsel of the U.S. Department of Health, Education, and Welfare, and have been incorporated into the *Ordinance*. Other changes have also been incorporated on the advice of various State and local legal counsel.

The *Ordinance* has been widely adopted and used for many years, and has been upheld by court actions. One of the most comprehensive decisions upholding the various provisions of the *Ordinance* was that of the district court, Reno County, Kans., in the case of *Billings et al.* v. *City of Hutchinson et al.*, decided May 1, 1934. In this action, the plaintiffs unsuccessfully sought to enjoin the enforcement of the Hutchinson ordinance on the grounds that (*a*) it was unreasonable, (*b*) it conflicted with State statutes, (*c*) the license fees provided in the local ordinance (but not in the *Ordinance* recommended by the Public Health Service) where in excess of expenses, and (*d*) the milk inspector was clothed with arbitrary powers (Reprint No. 1629 from *Public Health Reports* of June 8, 1934).

The model ordinance discourages the use of public health regulations to establish unwarranted trade barriers against the acceptance of high quality milk from other milksheds (Sec. 11). On repeated requests of the Association of State and Territorial Health Officers and of the National Conference on Interstate Milk Shipments, the Public Health Service is cooperating actively in a voluntary program for certification of interstate milk shippers. Such a program would be impossible without widespread agreement on uniform standards, such as those of the recommended *Ordinance*.

This program of interstate milk certification was supported also by the Committee on Agriculture and Forestry of the U.S. Senate, which "strongly recommended" (in its Report on Utilization of Farm Crops, Aug. 1, 1961), "that the *Milk Ordinance* of the Public Health Service should be used as the minimum standard for the sanitary rating and acceptance of interstate milk shipments."

The value of these standards as a means of overcoming interstate trade barriers was recognized by the U.S. Supreme Court in the case of the *Dean Milk Company* v. *City of Madison*. The Court reversed the decision of the Wisconsin Supreme Court which had sustained an ordinance requirement imposing a 5-mile limit on the location of pasteurization plants selling milk in Madison, and pointed out that Madison consumers would be adequately safeguarded if the city relied upon the provisions of Section 11 of the Public Health Service recommended *Milk Ordinance* (No. 258—October term, 1950).

The Public Health Service has no legal jurisdiction in the enforcement of milk sanitation standards except on interstate carriers. Elsewhere, it serves solely in an advisory and stimulative capacity. Its program is designed primarily to assist State and local regulatory agencies. Its aim is to promote the establishment of effective and well-balanced milk sanitation programs in each State, to stimulate the adoption of adequate and uniform State and local control legislation, and to encourage the application of uniform enforcement procedures through appropriate legal and educational measures.

When this *Ordinance* is adopted locally, its enforcement becomes a function of the local or State authorities. Consequently, the *Ordinance* should be adopted only if adequate provision can be made for qualified personnel and for suitable laboratory facilities. Small municipalities which cannot afford to provide these services should arrange for supervision by the county or State health department, or seek cooperation with neighboring municipalities in organizing a milk-control district or area.

The charter and the legal counsel of the government unit involved should be consulted for information or advice on proper legal procedures, such as the recording and advertising of the *Ordinance* after passage.

Adoption.—In the interest of national uniformity, it is recommended that no changes be made in this *Ordinance* when adopted by a State or local community, unless changes are necessary to avoid conflict with State law. Modifications should be contemplated with extreme caution so as not to render the *Ordinance* unenforceable.

Amendment of Existing Regulations.—States and communities that have adopted the 1953, or an earlier, edition of the PHS recommended *Milk Ordinance* are urged to bring such *Ordinance* up to date in order to take advantage of the most current developments in milk sanitation and administration. States and communities whose milk sanitation law or regulations are not based on past PHS recommended milk sanitation ordinances are urged to consider the attendant public health benefits, as well as those economic in nature, which can accrue upon adoption and implementation of the *Pasteurized Milk Ordinance.*

Acknowledgments.—The basic responsibility for the preparation and publication of this *Pasteurized Milk Ordinance* was assumed by the Milk Sanitation Section of the Milk and Food Branch, Division of Environmental Engineering and Food Protection, under the direction of Darold W. Taylor, Sanitarian Director, with invaluable assistance from the operational and research milk and food consultants of the Public Health Service. Particular credit is due to Luther A. Black, Ph. D., Robert B. Carson, Frederick O. DeSieghardt, Joe L. Perrin, Richard W. Peterson, Kenneth L. Pool, and Irving H. Schlafman for their very substantial contributions.

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PART I

GRADE A PASTEURIZED MILK ORDINANCE—1965 RECOMMENDATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE

An ordinance defining "milk" and certain "milk products," "milk producer," "pasteurization," etc.; prohibiting the sale of adulterated and misbranded milk and milk products; requiring permits for the sale of milk and milk products; regulating the inspection of dairy farms and milk plants, and the examination, labeling, pasteurization, distribution and sale of milk and milk products; providing for the construction of future dairy farms and milk plants, the enforcement of this Ordinance, and the fixing of penalties.

Be it ordained by the ____________ of ____________ [a,1] as follows:

SECTION 1. DEFINITIONS

The following definitions shall apply in the interpretation and the enforcement of this *Ordinance:*

A. Milk.—Milk is hereby defined to be the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows, which contains not less than 8¼ percent milk solids-not-fat and not less than 3¼ percent milkfat. (Milkfat or butterfat is the fat of milk.)

A–1. Goat Milk.—Goat milk is the lacteal secretion, practically free from colostrum, obtained by the complete milking of healthy goats. The word "milk" shall be interpreted to include goat milk.

B. Cream.—Cream is the sweet, fatty liquid separated from milk, with or without the addition of milk or skim milk, which contains not less than 18 percent milkfat.[2]

B–1. Light Cream, Coffee Cream, or Table Cream.—Light cream, coffee cream, or table cream is cream which contains not less than 18 percent but less than 30 percent milkfat.[2]

B–2. Whipping Cream.—Whipping cream is cream which contains not less than 30 percent milkfat.[2]

B–3. Light Whipping Cream.—Light whipping cream is cream that contains not less than 30 percent but less than 36 percent milkfat.[2]

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[a] Numbered footnotes are assembled on p. 92.

B–4. Heavy Cream or Heavy Whipping Cream.—Heavy cream or heavy whipping cream is cream which contains not less than 36 percent milkfat.[2]

B–5. Whipped Cream.—Whipped cream is whipping cream into which air or gas has been incorporated.[2]

B–6. Whipped Light Cream, Coffee Cream, or Table Cream.—Whipped light cream, coffee cream, or table cream is light cream, coffee cream, or table cream into which air or gas has been incorporated.[2]

B-7. Sour Cream or Cultured Sour Cream.—Sour cream or cultured sour cream is a fluid or semifluid cream resulting from the souring, by lactic acid producing bacteria or similar culture, of pasteurized cream, which contains not less than 0.20 percent acidity expressed as lactic acid.[2]

C. Half-and-Half.—Half-and-half is a product consisting of a mixture of milk and cream which contains not less than 10.5 percent milkfat.[2]

C–1. Sour Half-and-Half or Cultured Half-and-Half.—Sour half-and-half or cultured half-and-half is fluid or semifluid half-and-half derived from the souring, by lactic acid producing bacteria or similar culture, of pasteurized half-and-half, which contains not less than 0.20 percent acidity expressed as lactic acid.[2]

D. Reconstituted or Recombined Milk and Milk Products.—Reconstituted or recombined milk and/or milk products shall mean milk or milk products defined in this section which result from the recombining of milk constitutents with potable water.[2, 3]

E. Concentrated Milk.—Concentrated milk is a fluid product, unsterilized and unsweetened, resulting from the removal of a considerable portion of the water from milk, which, when combined with potable water, results in a product conforming with the standards for milkfat and solids-not-fat of milk as defined above.[2]

E–1. Concentrated Milk Products.—Concentrated milk products shall be taken to mean and to include homogenized concentrated milk, vitamin D concentrated milk, concentrated skim milk, fortified concentrated skim milk, concentrated lowfat milk, fortified concentrated lowfat milk, concentrated flavored milk, concentrated flavored milk products, and similar concentrated products made from concentrated milk or concentrated skim milk, and which, when combined with potable water in accordance with instructions printed on the container, conform with the definitions of the corresponding milk products in this section.[2]

F. Skim Milk or Skimmed Milk.—Skim milk or skimmed milk is milk from which sufficient milkfat has been removed to reduce its milkfat content to less than 0.50 percent.[2]

G. Lowfat Milk.—Lowfat milk is milk from which a sufficient portion of milkfat has been removed to reduce its milkfat content to not less than 0.50 percent and not more than 2.0 percent.[2]

H. Vitamin D Milk and Milk Products.—Vitamin D milk and milk products are milk and milk products, the vitamin D content of which has been increased by an approved method to at least 400 U.S.P. units per quart.[2]

I. Fortified Milk and Milk Products.—Fortified milk and milk products are milk and milk products other than vitamin D milk and milk products, the vitamin and/or mineral content of which have been increased by a method and in an amount approved by the health authority.[2]

J. Homogenized Milk.—Homogenized milk is milk which has been treated to insure breakup of the fat globules to such an extent that, after 48 hours of quiescent storage at 45° F., no visible cream separation occurs on the milk, and the fat percentage of the top 100 milliliters of milk in a quart, or of proportionate volumes in containers of other sizes, does not differ by more than 10 percent from the fat percentage of the remaining milk as determined after thorough mixing. The word "milk" shall be interpreted to include homogenized milk.[2]

K. Flavored Milk or Milk Products.—Flavored milk or milk products shall mean milk and milk products as defined in this *Ordinance* to which has been added a flavor and/or sweetener.[2]

L. Buttermilk.—Buttermilk is a fluid product resulting from the manufacture of butter from milk or cream. It contains not less than 8¼ percent of milk solids-not-fat.[2]

L-1. Cultured Buttermilk.—Cultured buttermilk is a fluid product resulting from the souring, by lactic acid producing bacteria or similar culture, of pasteurized skim milk or pasteurized lowfat milk.[2]

M. Cultured Milk or Cultured Whole Milk Buttermilk.—Cultured milk or cultured whole milk buttermilk is a fluid product resulting from the souring, by lactic acid producing bacteria or similar culture, of pasteurized milk.[2]

N. Acidified Milk and Milk Products.—Acidified milk and milk products are milk and milk products obtained by the addition of food grade acids to pasteurized cream, half-and-half, milk, lowfat milk, or skim milk, resulting in a product acidity of not less than 0.20 percent expressed as lactic acid.[2]

O. Milk Products.—Milk products include cream, light cream, coffee cream, table cream, whipping cream, light whipping cream, heavy cream, heavy whipping cream, whipped cream, whipped light cream, whipped coffee cream, whipped table cream, sour cream, cultured sour cream, half-and-half, sour half-and-half, cultured half-and-half, reconstituted or recombined milk and milk products, concentrated milk, concentrated milk products, skim milk, skimmed milk, lowfat milk, fortified milk and milk products, vitamin D milk and milk products, homogenized milk, flavored milk or milk products, buttermilk, cultured buttermilk, cultured milk, cultured whole milk buttermilk, and acidified milk and milk products.[2 3 4]

This definition is not intended to include such products as sterilized milk and milk products hermetically sealed in a container and so processed, either before or after sealing, as to prevent microbial spoilage, or evaporated milk, condensed milk, ice cream and other frozen deserts, butter, dry milk products (except as defined herein), or cheese except when they are combined with other substances to produce any pasteurized milk or milk product defined herein.

P. Grade A Dry Milk Products.—Grade A dry milk products are milk products which have been produced for use in Grade A pasteurized milk products and which have been manufactured under the provisions of *Grade A Dry Milk Products—Recommended Sanitation Ordinance and Code for Dry Milk Products Used in Grade A Pasteurized Milk Products.*

Q. Optional Ingredients.—Optional ingredients shall mean and include Grade A dry milk products, concentrated milk, concentrated milk products, flavors, sweeteners, stabilizers, emulsifiers, acidifiers, vitamins, minerals, and similar ingredients.

R. Adulterated Milk and Milk Products.—Any milk or milk product shall be deemed to be adulterated (1) if it bears or contains any poisonous or deleterious substance in a quantity which may render it injurious to health; (2) if it bears or contains any added poisonous or deleterious substance for which no safe tolerance has been established by State or Federal regulation, or in excess of such tolerance if one has been established; (3) if it consists, in whole or in part, of any substance unfit for human consumption; (4) if it has been produced, processed, prepared, packed, or held under insanitary conditions; (5) if its container is composed, in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health; or (6) if any substance has been added thereto or mixed or packed therewith so as to increase its bulk or weight, or reduce its quality or strength, or make it appear better or of greater value than it is.

R-1. Misbranded Milk and Milk Products.—Milk and milk products are misbranded (1) when their container(s) bear or accompany any false or misleading written, printed or graphic matter; (2) when such milk and milk products do not conform to their definitions as contained in this *Ordinance;* and (3) when such products are not labeled in accordance with Section 4 of this *Ordinance.*

S. Pasteurization.—The terms "pasteurization," "pasteurized," and similar terms shall mean the process of heating every particle of milk or milk product to at least 145° F., and holding it continuously at or above this temperature for at least 30 minutes, or to at least 161° F., and holding it continuously at or above this temperature for at least 15 seconds, in equipment which is properly operated and approved by the health authority: *Provided,* That milk products which have a higher milkfat content than milk and/or contain added sweeteners shall be heated to at least 150° F., and held continuously at or above this temperature for at least 30 minutes, or to at least 166° F., and held continuously at or above this temperature for at least 15 seconds: *Provided further,* That nothing in this definition shall be construed as barring any other pasteurization process which has been recognized by the United States Public Health Service to be equally efficient and which is approved by the State health authority.

T. Sanitization.—Sanitization is the application of any effective method or substance to a clean surface for the destruction of pathogens, and of other organisms as far as is practicable. Such treatment shall not adversely affect the equipment, the milk or milk product or the health of consumers, and shall be acceptable to the health authority.

U. Milk Producer.—A milk producer is any person who operates a dairy farm and provides, sells, or offers milk for sale to a milk plant, receiving station, or transfer station.

V. Milk Hauler.—A milk hauler is any person who transports raw milk and/or raw milk products to or from a milk plant, a receiving or transfer station.

W. Milk Distributor.—A milk distributor is any person who offers for sale or sells to another any milk or milk products.

X. Health Authority.—The health authority shall mean the ---------------- of the ---------------[1] or his authorized representative. The term, "Health Authority," wherever it appears in this *Ordinance,* shall mean the appropriate agency having jurisdiction and control over the matters embraced within this *Ordinance.*

Y. Dairy Farm.—A dairy farm is any place or premises where one or more cows or goats are kept, and from which a part or all of the milk or milk product(s) is provided, sold, or offered for sale to a milk plant, transfer station, or receiving station.

Z. Milk Plant and/or Receiving Station.—A milk plant and/or receiving station is any place, premises, or establishment where milk or milk products are collected, handled, processed, stored, pasteurized, bottled, or prepared for distribution.

Z–1. Transfer Station.—A transfer station is any place, premises, or establishment where milk or milk products are transferred directly from one transport tank to another.

AA. Official Laboratory.—An official laboratory is a biological, chemical, or physical laboratory which is under the direct supervision of the State or a local health authority.

BB. Officially Designated Laboratory.—An officially designated laboratory is a commercial laboratory authorized to do official work by the supervising agency, or a milk industry laboratory officially designated by the supervising agency for the examination of producer samples of Grade A raw milk for pasteurization.

CC. Person.—The word "person" shall mean any individual, plant operator, partnership, corporation, company, firm, trustee, or association.

DD. And/or.—Where the term "and/or" is used, "and" shall apply where appropriate, otherwise "or" shall apply.

SECTION 2. ADULTERATED OR MISBRANDED MILK OR MILK PRODUCTS

No person shall, within the municipality of ---------------- of ----------------,[1] or its police jurisdiction, produce, provide, sell, offer, or expose for sale, or have in possession with intent to sell any milk or milk product which is adulterated or misbranded: *Provided*, That in an emergency, the sale of pasteurized milk and milk products which have not been graded, or the grade of which is unknown, may be authorized by the health authority, in which case such products shall be labeled "ungraded."

Any adulterated or misbranded milk or milk product may be impounded by the health authority and disposed of in accordance with applicable laws or regulations.

SECTION 3. PERMITS

It shall be unlawful for any person who does not possess a permit from the health authority of the ------------ of ------------ [1] to bring into, send into, or receive into the ------------ of ------------ [1] or its police jurisdiction, for sale, or to sell, or offer for sale therein, or to have in storage any milk or milk products defined in this *Ordinance*: *Provided*, That, grocery stores, restaurants, soda fountains, and similar establishments where milk or milk products are served or sold at retail, but not processed, may be exempt from the requirements of this section.

Only a person who complies with the requirements of this *Ordinance* shall be entitled to receive and retain such a permit. Permits shall not be transferable with respect to persons and/or locations.

The health authority shall suspend such permit, whenever he has reason to believe that a public health hazard exists; or whenever the permit holder has violated any of the requirements of this *Ordinance;* or whenever the permit holder has interfered with the health authority in the performance of his duties: *Provided*, That the health authority shall, in all cases, serve upon the holder a written notice of intent to suspend permit, which notice shall specify with particularity the violation(s) in question and afford the holder such reasonable opportunity to correct such violation(s) as may be agreed to by the parties, or in the absence of agreement, fixed by the health authority, before making any order of suspension effective: *Provided further*, That where the milk or milk product involved creates, or appears to create, an imminent hazard to the public health; or in any case of a willful refusal to permit authorized inspection; or when the bacteria counts, coliform determinations, or cooling temperatures are in violation of the applicable requirements of Section 6 or Section 11, the health authority shall immediately suspend such permit. A suspension of permit shall remain in effect until the violation has been corrected to the satisfaction of the health authority.

Upon written application of any person whose permit has been suspended, or upon application within 48 hours of any person who has been served with a notice of intention to suspend, the health authority shall within 72 hours proceed to a hearing to ascertain the facts of such violation or interference and upon evidence presented at such hearing shall affirm, modify, or rescind the suspension.

Upon repeated violation(s), the health authority may revoke such permit following reasonable notice to the permit holder and an opportunity for a hearing. This section is not intended to preclude the institution of court action as provided in Sections 5 and 6.

SECTION 4. LABELING

All bottles, containers, and packages enclosing milk or milk products defined in Section 1 shall be conspicuously labeled or marked with (1) the name of the contents as given in the definitions of this *Ordinance;* (2) the word "reconstituted" or "recombined" if the product is made by reconstitution or recombination;[3] (3) the grade of the contents;

(4) the word "pasteurized" if the contents are pasteurized and the identity of the plant where pasteurized; (5) the word "raw" if the contents are raw and the name or other identity of the producer; (6) the designation "Vitamin D" and the number of U.S.P. units per quart in the case of vitamin D milk or milk products; (7) the volume or proportion of water to be added for recombining in the case of concentrated milk or milk products; (8) the words "nonfat milk solids added" and the percentage added if such solids have been added, except that this requirement shall not apply to reconstituted or recombined milk or milk products; (9) the words "artificially sweetened" in the name if non-nutritive and/or artificial sweeteners are used; and (10) the common name of stabilizers, distillates, and ingredients: *Provided*, That (a) only the identity of the milk producer shall be required on cans delivered to a milk plant which receives only Grade A raw milk for pasteurization, and which immediately dumps, washes, and returns the cans to the milk producer; (b) the identity of both milk producer and the grade shall be required on cans delivered to a milk plant which receives both Grade A raw milk for pasteurization and ungraded raw milk, and which immediately dumps, washes, and returns the cans to the milk producer; (c) in the case of concentrated milk products, the specific name of the product shall be substituted for the generic term "concentrated milk products," e.g., "homogenized concentrated milk," "concentrated skim milk," "concentrated chocolate milk," "concentrated chocolate flavored lowfat milk"; (d) in the case of flavored milk or flavored reconstituted milk, the name of the principal flavor shall be substituted for the word "flavored";[b] and (e) in the case of cultured milk and milk products, the special type culture used may be substituted for the word "cultured," e.g., "acidophilus buttermilk," "bulgarian buttermilk," and "yogurt."

All vehicles and transport tanks containing milk or milk products shall be legibly marked with the name and address of the milk plant or hauler in possession of the contents.

Tanks transporting raw milk and milk products to a milk plant from sources of supply not under the routine supervision of the health authority are required to be marked with the name and address of the milk plant or hauler and shall be sealed; in addition, for each such shipment, a shipping statement shall be prepared containing at least the following information:

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[b] The Federal Food and Drug Administration considers the term "chocolate milk" misleading unless the flavoring ingredient used is "chocolate," "sweet chocolate," or "milk chocolate" complying with the appropriate standards of identity for these products. Milk and milk products flavored with "cocoa" may be labeled "chocolate flavored."

(1) Shipper's name, address, and permit number.
(2) Permit number of hauler, if not employee of shipper.
(3) Point of origin of shipment.
(4) Tanker identity number.
(5) Name of product.
(6) Weight of product.
(7) Grade of product.
(8) Temperature of product.
(9) Date of shipment.
(10) Name of supervising health authority at the point of origin.
(11) Whether the contents are raw, pasteurized, or otherwise heat treated.

Such statement shall be prepared in triplicate and shall be kept on file by the shipper, the consignee, and the carrier for a period of 6 months for the information of the health authority.

The labeling information which is required on all bottles, containers or packages of milk or milk products shall be in letters of an acceptable size, kind, and color satisfactory to the health authority and shall contain no marks or words which are misleading.

SECTION 5. INSPECTION OF DAIRY FARMS AND MILK PLANTS

Each dairy farm, milk plant, receiving station, and transfer station whose milk or milk products are intended for consumption within ------------[1] or its police jurisdiction shall be inspected by the health authority prior to the issuance of a permit. Following the issuance of a permit, each dairy farm and transfer station shall be inspected at least once every 6 months and each milk plant and receiving station shall be inspected at least once every 3 months. Should the violation of any requirement set forth in Section 7 be found to exist, a second inspection shall be required after the time deemed necessary to remedy the violation, but not before 3 days; the reinspection shall be used to determine compliance with the requirements of Section 7. Any violation of the same requirement of Section 7 on such reinspection shall call for permit suspension in accordance with Section 3 and/or court action.

One copy of the inspection report shall be handed to the operator, or other responsible person, or be posted in a conspicuous place on an inside wall of the establishment. Said inspection report shall not be defaced and shall be made available to the health authority upon request. An identical copy of the inspection report shall be filed with the records of the health authority.

Every milk producer, hauler, distributor, or plant operator shall, upon request of the health authority, permit access of officially designated persons to all parts of his establishment or facilities to determine compliance with the provisions of this *Ordinance*. A distributor or plant operator shall furnish the health authority, upon request, for official use only, a true statement of the actual quantities of milk and milk products of each grade purchased and sold, and a list of all sources of such milk and milk products, records of inspections, tests, and pasteurization time and temperature records.

It shall be unlawful for any person who in an official capacity obtains any information under the provisions of this *Ordinance* which is entitled to protection as a trade secret (including information as to quantity, quality, source or disposition of milk or milk products, or results of inspections or tests thereof) to use such information to his own advantage or to reveal it to any unauthorized person.

SECTION 6. THE EXAMINATION OF MILK AND MILK PRODUCTS

During any consecutive 6 months, at least four samples of raw milk for pasteurization shall be taken from each producer and four samples of raw milk for pasteurization shall be taken from each milk plant after receipt of the milk by the milk plant and prior to pasteurization. In addition, during any consecutive 6 months, at least four samples of pasteurized milk and at least four samples of each milk product defined in this *Ordinance* shall be taken from every milk plant. Samples of milk and milk products shall be taken while in possession of the producer or distributor at any time prior to final delivery. Samples of milk and milk products from dairy retail stores, food service establishments, grocery stores, and other places where milk and milk products are sold shall be examined periodically as determined by the health authority; and the results of such examination shall be used to determine compliance with Sections 2, 4, and 10. Proprietors of such establishments shall furnish the health authority, upon his request, with the names of all distributors from whom milk or milk products are obtained.

Required bacterial counts and cooling temperature checks shall be performed on raw milk for pasteurization. In addition, antibiotic tests on each producer's milk or on commingled raw milk shall be conducted at least four times during any consecutive 6 months. When commingled milk is tested, all producers shall be represented in the sample. All individual sources of milk shall be tested when test results on the commingled milk are positive. Required bacterial counts, coliform determinations, phosphatase and cooling temperature checks shall be performed on pasteurized milk and milk products.

Whenever a phosphatase test is positive, the cause shall be determined. Where the cause is improper pasteurization, it shall be corrected; and any milk or milk product involved shall not be offered for sale.

Samples shall be analyzed at an official or appropriate officially designated laboratory. All sampling procedures and required laboratory examinations shall be in substantial compliance with the ______ Edition of *Standard Methods for the Examination of Dairy Products* of the American Public Health Association, and the ______ Edition of *Official Methods of Analyses* of the Association of Official Agricultural Chemists. (Insert edition number current at time of adoption.) Such procedures and examinations shall be evaluated in accordance with the methods of evaluating milk laboratories recommended by the (U.S.) Public Health Service. Examinations and tests shall be conducted to detect adulterants, including pesticides, as the health authority shall require. Assays of vitamin D milk or milk products and/or fortified milk and milk products shall be made at least annually in a laboratory acceptable to the health authority.

SECTION 7. STANDARDS FOR MILK AND MILK PRODUCTS

All Grade A raw milk for pasteurization and all Grade A pasteurized milk and milk products shall be produced, processed, and pasteurized to conform with the following chemical, bacteriological, and temperature standards, and the sanitation requirements of this section.

No process or manipulation other than pasteurization, processing methods integral therewith, and appropriate refrigeration shall be applied to milk and milk products for the purpose of removing or deactivating microorganisms.

Chemical, Bacteriological and Temperature Standards for Grade A Milk and Milk Products

Grade A raw milk for pasteurization.	Temperature	Cooled to 50° F. or less and maintained thereat until processed.
	Bacterial limits	Individual producer milk not to exceed 100,000 per ml. prior to commingling with other producer milk. Not exceeding 300,000 per ml. as commingled milk prior to pasteurization.
	Antibiotics	No detectible antibiotic residues.
Grade A pasteurized milk and milk products (except cultured products).	Temperature	Cooled to 45° F. or less and maintained thereat.
	Bacterial limits	Milk and milk products—20,000 per ml.
	Coliform limit	Not exceeding 10 per ml.
	Phosphatase	Less than 1µg per ml., by Scharer Rapid Method (or equivalent by other means).
Grade A pasteurized cultured products.	Temperature	Same as above.
	Coliform limit	Do.
	Phosphatase	Do.
	Bacterial limits	Exempt.

SANITATION REQUIREMENTS FOR GRADE A RAW MILK FOR PASTEURIZATION

ITEM 1r. ABNORMAL MILK

Cows which show evidence of the secretion of abnormal milk in one or more quarters based upon bacteriological, chemical, or physical examination, shall be milked last or with separate equipment, and the milk shall be discarded. Cows treated with, or cows which have consumed chemical, medicinal or radioactive agents which are capable of being secreted in the milk and which, in the judgment of the health authority, may be deleterious to human health, shall be milked last or with separate equipment, and the milk disposed of as the health authority may direct.

ITEM 2r. MILKING BARN, STABLE, OR PARLOR—CONSTRUCTION

A milking barn, stable, or parlor shall be provided on all dairy farms in which the milking herd shall be housed during milking time operations. The areas used for milking purposes shall (1) have floors constructed of concrete or equally impervious material; (2) have walls and ceilings which are smooth, painted or finished in an approved manner, in good repair, ceiling dusttight; (3) have separate stalls or pens for horses, calves, and bulls; (4) be provided with natural and/or artificial light, well distributed for day and/or night milking; (5) provide sufficient airspace and air circulation to prevent condensation and excessive odors; (6) not be overcrowded; and (7) have dusttight covered boxes or bins, or separate storage facilities for ground, chopped, or concentrated feed.

ITEM 3r. MILKING BARN, STABLE, OR PARLOR—CLEANLINESS

The interior shall be kept clean. Floors, walls, windows, pipelines, and equipment shall be free of filth and/or litter and shall be clean. Swine and fowl shall be kept out of the milking barn.

ITEM 4r. COWYARD

The cowyard shall be graded and drained and shall have no standing pools of water or accumulations of organic wastes: *Provided*, That in loafing or cattle-housing areas, cow droppings and soiled bedding shall be removed, or clean bedding added, at sufficiently frequent intervals to prevent the soiling of the cow's udder and flanks.

Waste feed shall not be allowed to accumulate. Manure packs shall be properly drained and shall provide a reasonably firm footing. Swine shall be kept out of the cowyard.

ITEM 5r. MILKHOUSE OR ROOM—CONSTRUCTION AND FACILITIES

A milkhouse or room of sufficient size shall be provided, in which the cooling, handling, and storing of milk and the washing, sanitizing, and storing of milk containers and utensils shall be conducted.

The milkhouse shall be provided with a smooth floor constructed of concrete or equally impervious material graded to drain and maintained in good repair. Liquid waste shall be disposed of in a sanitary manner; all floor drains shall be accessible and shall be trapped if connected to a sanitary sewer system.

The walls and ceilings shall be constructed of smooth material, in good repair, well painted, or finished in an equally suitable manner.

The milkhouse shall have adequate natural and/or artificial light and be well ventilated.

The milkhouse shall be used for no other purpose than milkhouse operations; there shall be no direct opening into any barn, stable, or into a room used for domestic purposes: *Provided*, That a direct opening between the milkhouse and milking barn, stable, or parlor is permitted when a tight-fitting self-closing solid door(s) hinged to be single or double acting is provided.

Water under pressure shall be piped into the milkhouse.

The milkhouse shall be equipped with a two-compartment wash vat and adequate hot water heating facilities.

When a transportation tank is used for the cooling and storage of milk on the dairy farm, such tank shall be provided with a suitable shelter for the receipt of milk. Such shelter shall be adjacent to, but not a part of, the milkroom and shall comply with the requirements of the milkroom with respect to construction, light, drainage, insect and rodent control, and general maintenance.

ITEM 6r. MILKHOUSE OR ROOM—CLEANLINESS

The floors, walls, ceilings, windows, tables, shelves, cabinets, wash vats, non-product contact surfaces of milk containers, utensils, and equipment, and other milkroom equipment shall be clean. Only articles directly related to milkroom activities shall be permitted in the milkroom. The milkroom shall be free of trash, animals, and fowl.

ITEM 7r. TOILET

Every dairy farm shall be provided with one or more toilets, conveniently located and properly constructed, operated, and maintained in a sanitary manner. The waste shall be inaccessible to flies and shall not pollute the soil surface or contaminate any water supply.

ITEM 8r. WATER SUPPLY

Water for milkhouse and milking operations shall be from a supply properly located, protected, and operated, and shall be easily accessible, adequate, and of a safe, sanitary quality.

ITEM 9r. UTENSILS AND EQUIPMENT—CONSTRUCTION

All multiuse containers, equipment, and utensils used in the handling, storage, or transportation of milk shall be made of smooth, nonabsorbent, corrosion-resistant, nontoxic materials, and shall be so constructed as to be easily cleaned. All containers, utensils, and equipment shall be in good repair. All milk pails used for hand milking and stripping shall be seamless and of the hooded type. Multiple-use woven material shall not be used for straining milk. All single-service articles shall have been manufactured, packaged, transported, stored, and handled in a sanitary manner and shall comply with the applicable requirements of item 11p. of this section. Articles intended for single-service use shall not be reused.

Farm holding/cooling tanks, welded sanitary piping, and transportation tanks shall comply with the applicable requirements of items 10p. and 11p. of this section.

ITEM 10r. UTENSILS AND EQUIPMENT—CLEANING

The product-contact surfaces of all multiuse containers, equipment, and utensils used in the handling, storage, or transportation of milk shall be cleaned after each usage.

ITEM 11r. UTENSILS AND EQUIPMENT—SANITIZATION

The product-contact surfaces of all multiuse containers, equipment, and utensils used in the handling, storage, or transportation of milk shall be sanitized before each usage.

ITEM 12r. UTENSILS AND EQUIPMENT—STORAGE

All containers, utensils, and equipment used in the handling, storage, or transportation of milk, unless stored in sanitizing solutions, shall be stored to assure complete drainage, and shall be protected from contamination prior to use.

ITEM 13r. UTENSILS AND EQUIPMENT—HANDLING

After sanitization, all containers, utensils, and equipment shall be handled in such manner as to prevent contamination of any product-contact surface.

ITEM 14r. MILKING—FLANKS, UDDERS, AND TEATS

Milking shall be done in the milking barn, stable, or parlor. The flanks, udders, bellies, and tails of all milking cows shall be free from visible dirt. All brushing shall be completed prior to milking. The udders and teats of all milking cows shall be cleaned and treated with a sanitizing solution just prior to the time of milking, and shall be relatively dry before milking. Wet hand milking is prohibited.

ITEM 15r. MILKING—SURCINGLES, MILK STOOLS, AND ANTIKICKERS

Surcingles, milk stools, and antikickers shall be kept clean and stored above the floor.

ITEM 16r. MILKING—TRANSFER AND PROTECTION OF MILK

Each pail or container of milk shall be transferred immediately from the milking barn, stable, or parlor to the milkhouse. No milk shall be strained, poured, transferred, or stored unless it is properly protected from contamination.

ITEM 17r. PERSONNEL—HAND-WASHING FACILITIES

There shall be provided adequate hand-washing facilities, including running water, soap or detergent, and individual sanitary towels, in the milkhouse and in or convenient to the milking barn, stable, or parlor.

ITEM 18r. PERSONNEL—CLEANLINESS

Hands shall be washed clean and dried with an individual sanitary towel immediately before milking, before performing any milkhouse function, and immediately after the interruption of any of these activities. Milkers and milk haulers shall wear clean outer garments while milking or handling milk, milk containers, utensils, or equipment.

ITEM 19r. COOLING

Raw milk for pasteurization shall be cooled to 50° F. or less within 2 hours after milking and shall be maintained at that temperature until delivered.

ITEM 20r. VEHICLES

Vehicles used to transport milk in cans from the dairy farm to the milk plant or receiving station shall be constructed and operated to protect their contents from sun, freezing, and contamination. Such vehicles shall be kept clean, inside and out; and no substance capable of contaminating milk shall be transported with milk.

ITEM 21r. INSECT AND RODENT CONTROL

Effective measures shall be taken to prevent the contamination of milk, containers, equipment, and utensils by insects and rodents, and by chemicals used to control such vermin. Milkrooms shall be free of insects and rodents. Surroundings shall be kept neat, clean, and free of conditions which might harbor or be conducive to the breeding of insects and rodents.

SANITATION REQUIREMENTS FOR GRADE A PASTEURIZED MILK AND MILK PRODUCTS

A receiving station shall comply with items 1p to 15p, inclusive, and 17p, 20p, and 22p, except that the partitioning requirement of item 5p shall not apply.

A transfer station shall comply with items 1p, 4p, 6p, 7p, 8p, 9p, 10p, 11p, 12p, 14p, 15p, 20p, and 22p; and as climatic and operating conditions require, the applicable provisions of items 2p and 3p: *Provided*, That in every case, overhead protection shall be provided. Facilities for the cleaning and sanitizing of bulk transport tanks shall comply with items 1p, 4p, 6p, 7p, 8p, 9p, 10p, 11p, 12p, 14p, 15p, 20p, and 22p; and as climatic and operating conditions require, the applicable provisions of items 2p and 3p: *Provided*, That in every case, overhead protection shall be provided.

ITEM 1p. FLOORS—CONSTRUCTION

The floors of all rooms in which milk or milk products are processed, handled, or stored, or in which milk containers, equipment, and utensils are washed, shall be constructed of concrete or other equally impervious and easily cleaned material; and shall be smooth, properly sloped, provided with trapped drains, kept in good repair: *Provided*, That cold-storage rooms used for storing milk and milk products need not be provided with floor drains when the floors are sloped to drain to one or more exits: *Provided further*, That storage rooms for storing dry ingredients and/or packaging materials need not be provided with drains; and the floors may be constructed of tightly joined wood.

ITEM 2p. WALLS AND CEILINGS—CONSTRUCTION

Walls and ceilings of rooms in which milk or milk products are handled, processed, or stored, or in which milk containers, utensils, and equipment are washed, shall have a smooth, washable, light-colored surface, in good repair.

ITEM 3p. DOORS AND WINDOWS

Effective means shall be provided to prevent the access of flies and rodents. All openings to the outside shall have solid doors or glazed windows which shall be closed during dusty weather.

ITEM 4p. LIGHTING AND VENTILATION

All rooms in which milk and milk products are handled, processed, or stored and/or in which milk containers, equipment, and utensils are washed shall be well lighted and well ventilated.

ITEM 5p. SEPARATE ROOMS

There shall be separate rooms for (1) pasteurizing, processing, cooling, and packaging; (2) cleaning of milk cans and bottles. In addition, plants receiving milk in bulk transport tanks shall provide for cleaning and sanitizing facilities.

Unless all milk and milk products are received in bulk transport tanks, a receiving room, separate from rooms (1) and (2) above, shall be required. Rooms in which milk or milk products are handled, processed, or stored, or in which milk containers, utensils, and equipment are washed or stored, shall not open directly into any stable or any room used for domestic purposes.

ITEM 6p. TOILET-SEWAGE DISPOSAL FACILITIES

Every milk plant shall be provided with toilet facilities conforming with the ordinances of the ------------ of ------------.[1] Toilet rooms shall not open directly into any room in which milk and/or milk products are processed. Toilet rooms shall be completely enclosed and shall have tight-fitting, self-closing doors. Dressing rooms, toilet rooms, and fixtures shall be kept in a clean condition, in good repair, and shall be well ventilated and well lighted. Sewage and other liquid wastes shall be disposed of in a sanitary manner.

ITEM 7p. WATER SUPPLY

Water for milk plant purposes shall be from a supply properly located, protected, and operated, and shall be easily accessible, adequate, and of a safe, sanitary quality.

ITEM 8p. HAND-WASHING FACILITIES

Convenient hand-washing facilities shall be provided, including hot and cold and/or warm running water, soap, and individual sanitary towels or other approved hand-drying devices. Hand-washing facilities shall be kept in a clean condition and in good repair.

ITEM 9p. MILK PLANT CLEANLINESS

All rooms in which milk and milk products are handled, processed, or stored, and/or in which containers, utensils, or equipment are washed or stored, shall be kept clean, neat, and free of evidence of insects and rodents. Pesticides shall be safely used. Only equipment directly related to processing operations or to the handling of containers, utensils, and equipment, shall be permitted in the pasteurizing, processing, cooling, packaging, and bulk milk storage rooms.

ITEM 10p. SANITARY PIPING

All sanitary piping, fittings, and connections which are exposed to milk and milk products, or from which liquids may drip, drain, or be drawn into milk or milk products, shall consist of smooth, impervious, corrosion-resistant, nontoxic, easily cleanable material. All piping shall be in good repair. Pasteurized milk and milk products shall be conducted from one piece of equipment to another only through sanitary piping.[c]

ITEM 11p. CONSTRUCTION AND REPAIR OF CONTAINERS AND EQUIPMENT

All multiuse containers and equipment with which milk or milk products come into contact shall be of smooth, impervious, corrosion-resistant, nontoxic material; shall be constructed for ease of cleaning; and shall be kept in good repair. All single-service containers, closures, gaskets, and other articles with which milk or milk products come in contact shall be nontoxic, and shall have been manufactured, packaged, transported, and handled in a sanitary manner. Articles intended for single-service use shall not be reused.

ITEM 12p. CLEANING AND SANITIZING OF CONTAINERS AND EQUIPMENT

The product-contact surfaces of all multiuse containers, utensils, and equipment used in the transportation, processing, handling, and storage of milk and milk products shall be effectively cleaned and shall be sanitized before each use.

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[c] **Communities desiring to regulate cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should add the following: "*Provided*, That cottage cheese, cheese dressings, or cheese ingredients may be transported by other methods which protect the product from contamination."**

ITEM 13p. STORAGE OF CLEANED CONTAINERS AND EQUIPMENT

After cleaning, all multiuse milk or milk product containers, utensils, and equipment shall be transported and stored to assure complete drainage, and shall be protected from contamination before use.

ITEM 14p. STORAGE OF SINGLE-SERVICE CONTAINERS, UTENSILS AND MATERIALS

Single-service caps, cap stock, parchment paper, containers, gaskets, and other single-service articles for use in contact with milk and milk products shall be purchased and stored in sanitary tubes, wrappings, or cartons; shall be kept therein in a clean, dry place until used; and shall be handled in a sanitary manner.

ITEM 15p. PROTECTION FROM CONTAMINATION

Milk plant operations, equipment, and facilities shall be located and conducted to prevent any contamination of milk or milk products, ingredients, equipment, containers, and utensils. All milk or milk products or ingredients which have been spilled, overflowed, or leaked shall be discarded. The processing or handling of products other than milk and milk products in the pasteurization plant shall be performed to preclude the contamination of such milk and milk products.

ITEM 16p. PASTEURIZATION

Pasteurization shall be performed as defined in Section 1, Definition (S), of this *Ordinance*.

ITEM 17p. COOLING OF MILK

All raw milk and milk products shall be maintained at 50° F. or less until processed. All pasteurized milk and milk products, except those to be cultured, shall be cooled immediately in approved equipment to a temperature of 45° F. or less. All pasteurized milk and milk products shall be stored at a temperature of 45° F. or less and shall be maintained thereat until delivery. Every room or tank in which milk or milk products are stored shall be equipped with an accurate thermometer.

ITEM 18p. BOTTLING AND PACKAGING

Bottling and packaging of milk and milk products shall be done at the place of pasteurization in approved mechanical equipment.[4]

ITEM 19p. CAPPING

Capping or closing of milk and milk product containers shall be done in a sanitary manner by approved mechanical capping and/or closing equipment. The cap or closure shall protect the pouring lip to at least its largest diameter.

ITEM 20p. PERSONNEL—CLEANLINESS

Hands shall be thoroughly washed before commencing plant functions and as often as may be required to remove soil and contamination. No employee shall resume work after visiting the toilet room without thoroughly washing his hands. All persons engaged in the processing, pasteurization, handling, storage, or transportation of milk, milk products, containers, equipment, and utensils shall wear clean outer garments. The use of tobacco by any person engaged in the processing of milk or milk products is prohibited.

ITEM 21p. VEHICLES

All vehicles used for transportation of pasteurized milk and milk products shall be constructed and operated so that the milk and milk products are maintained at 45° F. or less, and are protected from sun, from freezing, and from contamination.

ITEM 22p. SURROUNDINGS

Milk plant surroundings shall be kept neat, clean, and free from conditions which might attract or harbor flies, other insects, and rodents, or which otherwise constitute a nuisance.

SECTION 8. ANIMAL HEALTH

All milk for pasteurization shall be from herds which are located in a Modified Accredited Tuberculosis Area as determined by the U.S. Department of Agriculture: *Provided*, That herds located in an area that fails to maintain such accredited status shall have been accredited by said Department as tuberculosis free, or shall have passed an annual tuberculosis test.

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[4] Communities desiring to regulate the sale of cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should add the following: "*Provided*, That cottage cheese and creamed cottage cheese may be transported in sealed containers in a protected, sanitary manner from one plant to another for creaming and/or packaging."

All milk for pasteurization shall be from herds under a brucellosis eradication program which meets one of the following conditions:

1. Located in a Certified Brucellosis-Free Area as defined by the U.S. Department of Agriculture and enrolled in the testing program for such areas; or
2. Located in a Modified Certified Brucellosis Area as defined by the U.S. Department of Agriculture and enrolled in the testing program for such areas; or
3. Meet U.S. Department of Agriculture requirements for an individually certified herd; or
4. Participating in a milk ring testing program which is conducted on a continuing basis at intervals of not less than every 3 months or more than every 6 months with individual blood tests on all animals in herds showing suspicious reactions to the milk ring test; or
5. Have an individual blood agglutination test annually with an allowable maximum grace period not exceeding 2 months.

For diseases other than brucellosis and tuberculosis, the health authority shall require such physical, chemical, or bacteriological tests as he deems necessary. The diagnosis of other diseases in dairy cattle shall be based upon the findings of a licensed veterinarian or a veterinarian in the employ of an official agency. Any diseased animal disclosed by such test(s) shall be disposed of as the health authority directs.

SECTION 9. MILK AND MILK PRODUCTS WHICH MAY BE SOLD

From and after 12 months from the date on which this *Ordinance* is adopted, only Grade A pasteurized milk and milk products* shall be sold to the final consumer, or to restaurants, soda fountains, grocery stores, or similar establishments: *Provided*, That in an emergency, the sale of pasteurized milk and milk products which have not been graded, or the grade of which is unknown, may be authorized by the health authority; in which case, such milk and milk products shall be labeled "ungraded."

Note.—Certified pasteurized milk is derived from certified raw milk which meets the latest requirements of the American Association of Medical Milk Commissions, Inc., 405 Lexington Ave., New York, N.Y., 10017.

SECTION 10. TRANSFERRING: DELIVERY CONTAINERS: COOLING

Except as permitted in this section, no milk producer or distributor shall transfer milk or milk products from one container or tank truck to another on the street, in any vehicle, store, or in any place except a milk plant, receiving station, transfer station, or milkhouse especially used for that purpose. The dipping or ladling of milk or fluid milk products is prohibited.

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* Communities wishing to provide for the sale of certified pasteurized milk should include such product in this section.

It shall be unlawful to sell or serve any milk or fluid milk product except in the individual, original container received from the distributor, or from an approved bulk dispenser: *Provided*, That this requirement shall not apply to milk for mixed drinks requiring less than one-half pint of milk, or to cream, whipped cream, or half-and-half which is consumed on the premises and which may be served from the original container of not more than one-half gallon capacity, or from a bulk dispenser approved for such service by the health authority.

It shall be unlawful to sell or serve any pasteurized milk or milk product which has not been maintained at a temperature of 45° F. or less. If containers of pasteurized milk or milk products are stored in ice, the storage container shall be properly drained.

SECTION 11. MILK AND MILK PRODUCTS FROM POINTS BEYOND THE LIMITS OF ROUTINE INSPECTION

Milk and milk products from points beyond the limits of routine inspection of the ------------ of ------------,[1] or its police jurisdiction may be sold in ------------,[1] or its police jurisdiction, provided they are produced and pasteurized under regulations which are substantially equivalent to this *Ordinance* and have been awarded an acceptable milk sanitation compliance and enforcement rating made by a State milk sanitation rating officer certified by the U.S. Public Health Service.

SECTION 12. FUTURE DAIRY FARMS AND MILK PLANTS

Properly prepared plans for all milkhouses, milking barns, stables, parlors, transfer stations, receiving stations, and milk plants regulated under this *Ordinance* which are hereafter constructed, reconstructed, or extensively altered, shall be submitted to the health authority for written approval before work is begun.

SECTION 13. PERSONNEL HEALTH

No person affected with any disease in a communicable form, or while a carrier of such disease, shall work at any dairy farm or milk plant in any capacity which brings him into contact with the production, handling, storage, or transportation of milk, milk products, containers, equipment, and utensils; and no dairy farm or milk plant operator shall employ in any such capacity any such person, or any person suspected of having any disease in a communicable form, or of being a carrier of such disease. Any producer or distributor of milk or milk products, upon whose dairy farm, or in whose milk plant any communicable disease occurs, or who suspects that any employee has contracted any disease in a communicable form, or has become a carrier of such disease, shall notify the health authority immediately.

SECTION 14. PROCEDURE WHEN INFECTION IS SUSPECTED

When reasonable cause exists to suspect the possibility of transmission of infection from any person concerned with the handling of milk and/or milk products, the health authority is authorized to require any or all of the following measures: (1) the immediate exclusion of that person from milk handling; (2) the immediate exclusion of the milk supply concerned from distribution and use; and (3) adequate medical and bacteriological examination of the person, of his associates, and of his and their body discharges.

SECTION 15. ENFORCEMENT

This *Ordinance* shall be enforced by the health authority in accordance with the *Grade A Pasteurized Milk Ordinance with Administrative Procedures—1965 Recommendations of the United States Public Health Service*, a certified copy [5] of which shall be on file at the municipal clerk's office.[1] Where the mandatory compliance with provisions of the appendixes is specified, such provisions shall be deemed a requirement of the *Ordinance*.

SECTION 16. PENALTY

Any person who shall violate any of the provisions of this *Ordinance* shall be guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not more than $____, and/or such persons may be enjoined from continuing such violations. Each day upon which such a violation occurs shall constitute a separate violation.

SECTION 17. REPEAL AND DATE OF EFFECT

All ordinances and parts of ordinances in conflict with this *Ordinance* shall be repealed 12 months after the adoption of this *Ordinance*, at which time this *Ordinance* shall be in full force and effect, as provided by law.

SECTION 18. UNCONSTITUTIONALITY CLAUSE

Should any section, paragraph, sentence, clause, or phrase of this *Ordinance* be declared unconstitutional or invalid for any reason, the remainder of this *Ordinance* shall not be affected thereby.

PART II

GRADE A PASTEURIZED MILK ORDINANCE WITH ADMINISTRATIVE PROCEDURES—1965 RECOMMENDATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE

An ordinance defining "milk" and certain "milk products," "milk producer," "pasteurization," etc.; prohibiting the sale of adulterated and misbranded milk and milk products; requiring permits for the sale of milk and milk products; regulating the inspection of dairy farms and milk plants, and the examination, labeling, pasteurization, distribution and sale of milk and milk products; providing for the construction of future dairy farms and milk plants, the enforcement of this Ordinance, and the fixing of penalties.

Be it ordained by the ------------ of ---------- [a,1] as follows:

SECTION I. DEFINITIONS

The following definitions shall apply in the interpretation and the enforcement of this *Ordinance:*

A. Milk.*—Milk is hereby defined to be the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows, which contains not less than 8¼ percent milk solids-not-fat and not less than 3¼ percent milkfat. (Milkfat or butterfat is the fat of milk.)*

A-1. Goat Milk.*—Goat milk is the lacteal secretion, practically free from colostrum, obtained by the complete milking of healthy goats. The word "milk" shall be interpreted to include goat milk.*

B. Cream.*—Cream is the sweet, fatty liquid separated from milk, with or without the addition of milk or skim milk, which contains not less than 18 percent milkfat.*[2]

B-1. Light Cream, Coffee Cream, or Table Cream.*—Light cream, coffee cream, or table cream is cream which contains not less than 18 percent but less than 30 percent milkfat.*[2]

B-2. Whipping Cream.*—Whipping cream is cream which contains not less than 30 percent milkfat.*[2]

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[a] Numbered footnotes are assembled on p. 92.

B-3. Light Whipping Cream.—*Light whipping cream is cream that contains not less than 30 percent but less than 36 percent milkfat.*[2]

B-4. Heavy Cream or Heavy Whipping Cream.—*Heavy cream or heavy whipping cream is cream which contains not less than 36 percent milkfat.*[2]

B-5. Whipped Cream.—*Whipped cream is whipping cream into which air or gas has been incorporated.*[2]

B-6. Whipped Light Cream, Coffee Cream, or Table Cream.—*Whipped light cream, coffee cream, or table cream is light cream, coffee cream, or table cream into which air or gas has been incorporated.*[2]

B-7. Sour Cream or Cultured Sour Cream.—*Sour cream or cultured sour cream is a fluid or semifluid cream resulting from the souring, by lactic acid producing bacteria or similiar culture, of pasteurized cream, which contains not less than 0.20 percent acidity expressed as lactic acid.*[2]

C. Half-and-Half.—*Half-and-half is a product consisting of a mixture of milk and cream which contains not less than 10.5 percent milkfat.*[2]

C-1. Sour Half-and-Half or Cultured Half-and-Half.—*Sour half-and-half or cultured half-and-half is fluid or semifluid half-and-half derived from the souring, by lactic acid producing bacteria or similar culture, of pasteurized half-and-half, which contains not less than 0.20 percent acidity expressed as lactic acid.*[2]

D. Reconstituted or Recombined Milk and Milk Products.—*Reconstituted or recombined milk and/or milk products shall mean milk or milk products defined in this section which result from the recombining of milk constituents with potable water.*[2,3]

E. Concentrated Milk.—*Concentrated milk is a fluid product, unsterilized and unsweetened, resulting from the removal of a considerable portion of the water from milk, which, when combined with potable water, results in a product conforming with the standards for milkfat and solids-not-fat of milk as defined above.*[2]

E-1. Concentrated Milk Products.—*Concentrated milk products shall be taken to mean and to include homogenized concentrated milk, vitamin D concentrated milk, concentrated skim milk, fortified concentrated skim milk, concentrated lowfat milk, fortified concentrated lowfat milk, concentrated flavored milk, concentrated flavored milk products, and similar concentrated products made from concentrated milk or concentrated skim milk, and which, when combined with potable water in accordance with instructions printed on the container, conform with the definitions of the corresponding milk products in this section.*[2]

F. Skim Milk or Skimmed Milk.—*Skim milk or skimmed milk is milk from which sufficient milkfat has been removed to reduce its milkfat content to less than 0.50 percent.*[2]

G. Lowfat Milk.—*Lowfat milk is milk from which a sufficient portion of milkfat has been removed to reduce its milkfat content to not less than 0.50 percent and not more than 2.0 percent.*[2]

H. Vitamin D Milk and Milk Products.—*Vitamin D milk and milk products are milk and milk products, the vitamin D content of which has been increased by an approved method to at least 400 U.S.P. units per quart.*[2]

I. Fortified Milk and Milk Products.—*Fortified milk and milk products are milk and milk products other than vitamin D milk and milk products, the vitamin and/or mineral content of which have been increased by a method and in an amount approved by the health authority.*[2]

J. Homogenized Milk.—*Homogenized milk is milk which has been treated to insure breakup of the fat globules to such an extent that, after 48 hours of quiescent storage at 45° F., no visible cream separation occurs on the milk, and the fat percentage of the top 100 milliliters of milk in a quart, or of proportionate volumes in containers of other sizes, does not differ by more than 10 percent from the fat percentage of the remaining milk as determined after thorough mixing. The word "milk" shall be interpreted to include homogenized milk.*[2]

K. Flavored Milk or Milk Products.—*Flavored milk or milk products shall mean milk and milk products as defined in this* Ordinance *to which have been added a flavor and/or sweetener.*[2]

L. Buttermilk.—*Buttermilk is a fluid product resulting from the manufacture of butter from milk or cream. It contains not less than 8¼ percent of milk solids-not-fat.*[2]

L–1. Cultured Buttermilk.—*Cultured buttermilk is a fluid product resulting from the souring, by lactic acid producing bacteria or similar culture, of pasteurized skim milk or pasteurized lowfat milk.*[2]

M. Cultured Milk or Cultured Whole Milk Buttermilk.—*Cultured milk or cultured whole milk buttermilk is a fluid product resulting from the souring, by lactic acid producing bacteria or similar culture, of pasteurized milk.*[2]

N. Acidified Milk and Milk Products.—*Acidified milk and milk products are milk and milk products obtained by the addition of food grade acids to pasteurized cream, half-and-half, milk, lowfat milk, or skim milk, resulting in a product acidity of not less than 0.20 percent expressed as lactic acid.*[2]

O. Milk Products.—*Milk products include cream, light cream, coffee cream, table cream, whipping cream, light whipping cream, heavy cream, heavy whipping cream, whipped cream, whipped light cream, whipped coffee cream, whipped table cream, sour cream, cultured sour cream, half-and-half, sour half-and-half, cultured half-and-half, reconstituted or recombined milk and milk products, concentrated milk, concentrated milk products, skim milk, skimmed milk, lowfat milk, fortified milk and milk products, vitamin D milk and milk products, homogenized milk, flavored milk or milk products, buttermilk, cultured buttermilk, cultured milk, cultured whole milk buttermilk, and acidified milk and milk products.*[2,3,4]

This definition is not intended to included such products as sterilized milk and milk products hermetically sealed in a container and so processed, either before or after sealing, as to prevent microbial spoilage, or evaporated milk, condensed milk, butter, ice cream and other frozen desserts, dry milk products (except as defined herein), or cheese except when they are combined with other substances to produce any pasteurized milk or milk product defined herein.

P. Grade A Dry Milk Products.—*Grade A dry milk products are milk products which have been produced for use in Grade A pasteurized milk products and which have been manufactured under the provisions of* Grade A Dry Milk Products—Recommended Sanitation Ordinance and Code for Dry Milk Products Used in Grade A Pasteurized Milk Products.

Q. Optional Ingredients.—*Optional ingredients shall mean and include Grade A dry milk products, concentrated milk, concentrated milk products, flavors, sweeteners, stabilizers, emulsifiers, acidifiers, vitamins, minerals, and similar ingredients.*

R. Adulterated Milk and Milk Products.—*Any milk or milk product shall be deemed to be adulterated (1) if it bears or contains any poisonous or deleterious substance in a quantity which may render it injurious to health; (2) if it bears or contains any added poisonous or deleterious substance for which no safe tolerance has been established by State or Federal regulation, or in excess of such tolerance if one has been established; (3) if it consists, in whole or in part, of any substance unfit for human consumption; (4) if it has been produced, processed, prepared, packed, or held under insanitary conditions; (5) if its container is composed, in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health; or (6) if any substance has been added thereto or mixed or packed therewith so as to increase its bulk or weight, or reduce* *its quality or strength, or make it appear better or of greater value than it is.*

***R-1. Misbranded Milk and Milk Products.**—Milk and milk products are misbranded (1) when their container(s) bear or accompany any false or misleading written, printed or graphic matter; (2) when such milk and milk products do not conform to their definitions as contained in this* Ordinance; *and (3) when such products are not labeled in accordance with Section 4 of this* Ordinance.

***S. Pasteurization.**—The terms "pasteurization," "pasteurized," and similar terms shall mean the process of heating every particle of milk or milk product to at least 145° F., and holding it continuously at or above this temperature for at least 30 minutes, or to at least 161° F., and holding it continuously at or above this temperature for at least 15 seconds, in equipment which is properly operated and approved by the health authority:* Provided, *That milk products which have a higher milkfat content than milk and/or contain added sweeteners shall be heated to at least 150° F., and held continuously at or above this temperature for at least 30 minutes, or to at least 166° F., and held continuously at or above this temperature for at least 15 seconds,* Provided further, *That nothing in this definition shall be construed as barring any other pasteurization process which has been recognized by the United States Public Health Service to be equally efficient and which is approved by the State health authority.*

***T. Sanitization.**—Sanitization is the application of any effective method or substance to a clean surface for the destruction of pathogens, and of other organisms as far as is practicable. Such treatment shall not adversely affect the equipment, the milk or milk product or the health of consumers, and shall be acceptable to the health authority.*

***U. Milk Producer.**—A milk producer is any person who operates a dairy farm and provides, sells, or offers milk for sale to a milk plant, receiving station, or transfer station.*

***V. Milk Hauler.**—A milk hauler is any person who transports raw milk and/or raw milk products to or from a milk plant, receiving or transfer station.*

***W. Milk Distributor.**—A milk distributor is any person who offers for sale or sells to another any milk or milk products.*

***X. Health Authority.**—The health authority shall mean the ------------ of the ------------[1] or his authorized representative. The term, "Health Authority," wherever it appears in this* Ordinance, *shall mean the appropriate agency having jurisdiction and control over the matters embraced within this* Ordinance.

Y. Dairy Farm.*—A dairy farm is any place or premises where one or more cows or goats are kept, and from which a part or all of the milk or milk product(s) is provided, sold, or offered for sale to a milk plant, transfer station, or receiving station.*

Z. Milk Plant and/or Receiving Station.*—A milk plant and/or receiving station is any place, premises, or establishment where milk or milk products are collected, handled, processed, stored, pasteurized, bottled, or prepared for distribution.*

Z–1. Transfer Station.*—A transfer station is any place, premises, or establishment where milk or milk products are transferred directly from one transport tank to another.*

AA. Official Laboratory.*—An official laboratory is a biological, chemical, or physical laboratory which is under the direct supervision of the State or a local health authority.*

BB. Officially Designated Laboratory.*—An officially designated laboratory is a commercial laboratory authorized to do official work by the supervising agency, or a milk industry laboratory officially designated by the supervising agency for the examination of producer samples of Grade A raw milk for pasteurization.*

CC. Person.*—The word "person" shall mean any individual, plant operator, partnership, corporation, company, firm, trustee, or association.*

DD. And/or.*—Where the term "and/or" is used, "and" shall apply where appropriate, otherwise "or" shall apply.*

SECTION 2. ADULTERATED OR MISBRANDED MILK OR MILK PRODUCTS

No person shall, within the municipality of ------------ of ------------,[1] *or its police jurisdiction, produce, provide, sell, offer, or expose for sale, or have in possession with intent to sell any milk or milk product which is adulterated or misbranded:* Provided, *That in an emergency, the sale of pasteurized milk and milk products which have not been graded, or the grade of which is unknown, may be authorized by the health authority, in which case such products shall be labeled "ungraded."*

Any adulterated or misbranded milk or milk product may be impounded by the health authority and disposed of in accordance with applicable laws or regulations.

ADMINISTRATIVE PROCEDURES

This section of the *Ordinance* shall be used in impounding the products of, or preferring charges against, persons who adulterate or misbrand their milk or milk products or label them with any grade designation not authorized by the health authority under the terms of this *Ordinance*, or who sell or deliver ungraded milk or milk products except as may be permitted under this section in an emergency. An emergency is defined as a general and acute shortage in the milkshed, not simply one distributor's shortage.

SECTION 3. PERMITS

It shall be unlawful for any person who does not possess a permit from the health authority of the ------------ of ------------[1] *to bring into, send into, or receive into the ----------- of -----------*[1] *or its police jurisdiction, for sale, or to sell, or offer for sale therein, or to have in storage any milk or milk products defined in this* Ordinance: Provided, *That, grocery stores, restaurants, soda fountains, and similar establishments where milk or milk products are served or sold at retail, but not processed, may be exempt from the requirements of this section.*

Only a person who complies with the requirements of this Ordinance *shall be entitled to receive and retain such a permit. Permits shall not be transferable with respect to persons and/or locations.*

The health authority shall suspend such permit, whenever he has reason to believe that a public health hazard exists; or whenever the permit holder has violated any of the requirements of this Ordinance; *or whenever the permit holder has interfered with the health authority in the performance of his duties:* Provided, *That the health authority shall, in all cases, serve upon the holder a written notice of intent to suspend permit, which notice shall specify with particularity the violation(s) in question and afford the holder such reasonable opportunity to correct such violation(s) as may be agreed to by the parties, or in the absence of agreement, fixed by the health authority, before making any order of suspension effective.* Provided further, *that where the milk or milk product involved creates, or appears to create, an imminent hazard to the public health; or in any case of a willful refusal to permit authorized inspection; or when the bacteria counts, coliform determinations, or cooling temperatures are in violation of the applicable requirements of Section 6 or Section 11, the health authority shall immediately suspend such permit. A suspension of permit shall remain in effect until the violation has been corrected to the satisfaction of the health authority.*

Upon written application of any person whose permit has been suspended, or upon application within 48 hours of any person who has been served with a notice of intention to suspend, the health authority shall within 72 hours proceed to a hearing to ascertain the facts of *such violation or interference and upon evidence presented at such hearing shall affirm, modify, or rescind the suspension.*

Upon repeated violation(s), the health authority may revoke such permit following reasonable notice to the permit holder and an opportunity for a hearing. This section is not intended to preclude the institution of court action as provided in Sections 5 and 6.

ADMINISTRATIVE PROCEDURES

Issuance of Permits.—Every milk producer, milk distributor, milk hauler, and each milk plant, receiving station, and transfer station operator shall hold a valid permit. Milk producers who transport milk or milk products only from their own dairy farms and employees of a milk distributor or milk plant operator who possesses a valid permit, shall not be required to possess a hauler's permit. Grocery stores, restaurants, soda fountains, and similar establishments where milk or milk products are served or sold at retail but not processed, may be exempt from the requirements of this section.

Suspension of Permit.—When any requirement(s) of this *Ordinance* is violated, the permit holder is subject to the suspension of his permit.

The health authority may forgo suspension of the permit, provided the product or products in violation are not sold or offered for sale.

Hearings.—If a State or municipal administrative procedure act which provides procedures for administrative hearings and judicial review of administrative determinations is available, the act shall be made applicable by reference to the hearings provided for in the *Ordinance*. If such administrative procedure act is not available, appropriate procedures, including provision for notice, hearing officer, and his authority, record of hearing, rules or evidence, and court review shall be established by appropriate authority.

Reinstatement of Permits.—Any producer, distributor, hauler, or plant operator whose permit has been suspended may make written application for the reinstatement of his permit.

When the permit suspension has been due to a violation of any of the bacterial, coliform, or cooling-temperature standards, the health authority within 1 week after the receipt of a written application for reinstatement of permit, shall issue a temporary permit after determining by an inspection of the facilities and operating methods that the conditions responsible for the violation have been corrected. Samples shall then be taken at the rate of not more than two per week on separate days within a 3-week period, and the health authority shall reinstate the permit upon compliance with the appropriate standard as determined in accordance with Section 6 of this *Ordinance*.

Whenever the permit suspension has been due to a violation of a requirement other than the bacteriological, coliform, or cooling-temperature standards, the application shall contain a written statement to the effect that the violation(s) has been corrected. Within 1 week of the receipt of such an application, the health authority shall make an inspection of the applicant's establishment, and as many additional inspections thereafter as are deemed necessary, to determine that the applicant's establishment is complying with the requirements. When the findings justify, the permit shall be reinstated.

SECTION 4. LABELING

All bottles, containers, and packages enclosing milk or milk products defined in Section 1 of this Ordinance *shall be conspicuously labeled or marked with (1) the name of the contents as given in the definition in this* Ordinance; (2) the word *"reconstituted" or "recombined" if the product is made by reconstitution or recombination;*[3] *(3) the grade of contents; (4) the word "pasteurized" if the contents are pasteurized and the identity of the plant where pasteurized; (5) the word "raw" if the contents are raw and the name or other identity of the producer; (6) the designation "vitamin D" and the number of U.S.P. units per quart in the case of vitamin D milk or milk products; (7) the volume or proportion of water to be added for recombining in the case of concentrated milk or milk products; (8) the words "nonfat milk solids added" and the percentage added if such solids have been added, except that this requirement shall not apply to reconstituted or recombined milk or milk products; (9) the words "artificially sweetened" in the name if non-nutritive and/or artificial sweeteners are used; and (10) the common name of stabilizers, distillates, and ingredients:* Provided, *That (a) only the identity of the milk producer shall be required on cans delivered to a milk plant which receives only Grade A raw milk for pasteurization, and which immediately dumps, washes, and returns the cans to the milk producer; (b) the identity of both milk producer and the grade shall be required on cans delivered to a milk plant which receives both Grade A raw milk for pasteurization and ungraded raw milk, and which immediately dumps, washes, and returns the cans to the milk producer; (c) in the case of concentrated milk products, the specific name of the product shall be substituted for the generic term "concentrated milk products" e.g., "homogenized concentrated milk," "concentrated skim milk," "concentrated chocolate milk," "concen-*

trated chocolate flavored lowfat milk"; (d) in the case of flavored milk or flavored reconstituted milk, the name of the principal flavor shall be substituted for the word "flavored",[b] *and (e) in the case of cultured milk and milk products, the special type culture used may be substituted for the word "cultured," e.g., "acidophilus buttermilk," "bulgarian buttermilk," and "yogurt."*

All vehicles and transport tanks containing milk or milk products shall be legibly marked with the name and address of the milk plant or hauler in possession of the contents.

Tanks transporting raw milk and milk products to a milk plant from sources of supply not under the routine supervision of the health authority are required to be marked with the name and address of the milk plant or hauler and shall be sealed; in addition, for each such shipment, a shipping statement shall be prepared containing at least the following information:

(1) Shipper's name, address, and permit number.
(2) Permit number of hauler, if not employee of shipper.
(3) Point of origin of shipment.
(4) Tanker identity number.
(5) Name of product.
(6) Weight of product.
(7) Grade of product.
(8) Temperature of product.
(9) Date of shipment.
(10) Name of supervising health authority at the point of origin.
(11) Whether the contents are raw, pasteurized, or otherwise heat treated.

Such statement shall be prepared in triplicate and shall be kept on file by the shipper, the consignee, and the carrier for a period of 6 months for the information of the health authority.

The labeling information which is required on all bottles, containers or packages of milk or milk products shall be in letters of an acceptable size, kind, and color satisfactory to the health authority and shall contain no marks or words which are misleading.

ADMINISTRATIVE PROCEDURES

Emergency Supplies—Labeling.—When the sale of ungraded milk or milk products is authorized during emergencies, under the terms of Section 2, the label must bear the designation "ungraded." When such labeling is not available, the health authority shall take immediate steps to inform the public that the particular supply is ungraded, and that the supply will be properly labeled as soon as the distributor can obtain the required labels.

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[b] The Federal Food and Drug Administration considers the term "chocolate milk" misleading unless the flavoring ingredient used is "chocolate," "sweet chocolate," or "milk chocolate" complying with the appropriate standards of identity for these products. Milk and milk products flavored with "cocoa" may be labeled "chocolate flavored."

Identity Labeling.—"Identity," as used in this section, is defined as the name and address of the milk plant at which the pasteurization takes place. It is recommended that the voluntary national uniform coding system for identification of pasteurization plants at which milk and milk products are packaged, be adopted in order to provide a uniform system of codes throughout the country.

In cases where several pasteurization plants are operated by one firm, the common firm name may be utilized on milk bottles or containers: *Provided*, That the location of the plant at which the contents were pasteurized is also shown, either directly or by a code. This requirement is necessary in order to enable the health authority to identify the source of the pasteurized milk. The street address of the pasteurizing plant need not be shown when only one plant of a given name is located within the municipality.

The identity labeling requirement may be interpreted as permitting plants and persons to purchase and distribute, under their own label, milk and milk products processed and packaged at another plant, provided, that the label reads, "Processed at ____________ (name and address)," or that the processing and packaging plant is identified by a proper code.

Misleading Labels.—The health authority shall not permit the use of any misleading marks, words, or endorsements upon the label. He may permit the use of registered trade designs or similar terms on the bottle cap or label when, in his opinion, they are not misleading and are not so used as to obscure the labeling required by the *Ordinance*. The use of super grade designations shall not be permitted. Grade designations such as "Grade AA Pasteurized," "Selected Grade A Pasteurized," "Special Grade A Pasteurized," "Premium," etc., give the consumer the impression that such a grade is significantly safer than Grade A pasteurized. Such an implication is false, because the *Ordinance* requirements for Grade A pasteurized milk, when properly enforced, will insure that this grade of milk will be as safe as milk can practicably be made.

Note.—Milk or milk products shall be labeled in accordance with the provisions of Section 4 of this *Ordinance* and, when shipped interstate, shall fulfill the applicable requirements of the Federal Food, Drug, and Cosmetic Act, as amended.

SECTION 5. INSPECTION OF DAIRY FARMS AND MILK PLANTS

Each dairy farm, milk plant, receiving station, and transfer station whose milk or milk products are intended for consumption within ------------[1] *or its police jurisdiction shall be inspected by the health authority prior to the issuance of a permit. Following the issuance of a permit, each dairy farm and transfer station shall be inspected at lease once every 6 months and each milk plant and receiving station shall be inspected at least once every 3 months. Should the violation of any requirement set forth in Section 7 be found to exist, a second inspection shall be required after the time deemed necessary to remedy the violation, but not before 3 days; the reinspection shall be used to determine compliance with the requirements of Section 7. Any violation of the same requirement of Section 7 on such reinspection shall call for permit suspension in accordance with Section 3 and/or court action.*

One copy of the inspection report shall be handed to the operator, or other responsible person, or be posted in a conspicuous place on an inside wall of the establishment. Said inspection report shall not be defaced and shall be made available to the health authority upon request. An identical copy of the inspection report shall be filed with the records of the health authority.

Every milk producer, hauler, distributor, or plant operator shall, upon request of the health authority, permit access of officially designated persons to all parts of his establishment or facilities to determine compliance with the provisions of this Ordinance. *A distributor or plant operator shall furnish the health authority, upon request, for official use only, a true statement of the actual quantities of milk and milk products of each grade purchased and sold, and a list of all sources of such milk and milk products, records of inspections, tests, and pasteurization time and temperature records.*

It shall be unlawful for any person who in an official capacity obtains any information under the provisions of this Ordinance *which is entitled to protection as a trade secret (including information as to quantity, quality, source or disposition of milk or milk products, or results of inspections or tests thereof) to use such information to his own advantage or to reveal it to any unauthorized person.*

ADMINISTRATIVE PROCEDURES

Inspection Frequency.—One producer inspection every 6 months or one plant inspection every 3 months is not a desirable frequency; it is instead a legal minimum. Dairy farms and milk plants experiencing difficulty meeting requirements should be visited more frequently. Inspections of dairy farms shall be made at milking time as often as possible, and of milk plants at different times of the day, in order to ascertain if the processes of equipment assembly, sanitizing, pasteurization, cleaning, and other procedures comply with the requirements of this *Ordinance*.

Enforcement Procedure.—This section provides that a dairy farm or milk plant shall be subject to suspension of permit, and/or court action, if two successive inspections disclose violation of the same requirement.

Experience has demonstrated that a strict enforcement of the *Ordinance* leads to a better and friendlier relationship between the health authority and the milk industry than does a policy of enforcement which seeks to excuse violations and to defer penalty therefor. The sanitarian's criterion of satisfactory compliance should be neither too lenient nor unreasonably stringent. When a violation is discovered, the sanitarian should point out to the milk producer or plant operator the requirement that has been violated, discuss a method for correction, and set a time for correcting the violated requirement.

The penalties of suspension or revocation of permit, and/or court action, are provided to prevent continued violation of the provisions of this *Ordinance* but are worded to protect the dairy industry against unreasonable or arbitrary action. When a condition is found which constitutes an imminent health hazard, prompt action is necessary to protect the public health; therefore, the health authority is authorized, in Section 3, to suspend the permit immediately. However, except for such emergencies, no penalty is imposed on the producer or distributor upon the first violation of any of the sanitation requirements listed in Section 7. A producer or distributor found violating any requirement must be notified in writing and given a reasonable time to correct the violation(s) before an official reinspection is made. The requirement of giving written notice shall be deemed to have been satisfied by the handing to the operator or by the posting of an inspection report, as required by this section. After receipt of a notice of violation, but before the allotted time has elapsed, the producer or distributor shall have an opportunity to appeal the sanitarian's interpretation to the health authority or for an extension of the time allowed for correction.

Certified Industry Inspection.—The health authority may certify industry personnel to carry out cooperatively the provisions of this *Ordinance* with respect to the supervision of dairy farms. Reports of all inspections conducted by such personnel to determine compliance with the provisions of this *Ordinance* shall be forwarded to the health authority. All punitive actions and all inspections for the issuance or reinstatement of permits shall be performed by the health authority. Industry personnel shall be certified annually by the health authority in accordance with the provisions of Appendix B, p. 100.

Inspection Reports.—A copy of the inspection report shall be filed by the health authority and retained for at least 12 months. The results shall be entered on appropriate ledger forms. The use of a computer or other information retrieval system may be used. Examples of field inspection forms are included in Appendix L, p. 168.

SECTION 6. THE EXAMINATION OF MILK AND MILK PRODUCTS

During any consecutive 6 months, at least four samples of raw milk for pasteurization shall be taken from each producer and four samples of raw milk for pasteurization shall be taken from each milk plant after receipt of the milk by the milk plant and prior to pasteurization. In addition, during any consecutive 6 months, at least four samples of pasteurized milk and at least four samples of each milk product defined in this Ordinance *shall be taken from every milk plant. Samples of milk and milk products shall be taken while in possession of the producer or distributor at any time prior to final delivery. Samples of milk and milk products from dairy retail stores, food service establishments, grocery stores, and other places where milk and milk products are sold shall be examined periodically as determined by the health authority; and the results of such examination shall be used to determine compliance with Sections 2, 4, 10. Proprietors of such establishments shall furnish the health authority, upon his request, with the names of all distributors from whom milk or milk products are obtained.*

Required bacterial counts and cooling temperature checks shall be performed on raw milk for pasteurization. In addition, antibiotic tests on each producer's milk or on commingled raw milk shall be conducted at least four times during any consecutive 6 months. When commingled milk is tested, all producers shall be represented in the sample. All individual sources of milk shall be tested when test results on the commingled milk are positive. Required bacterial counts, coliform determinations, phosphatase, and cooling temperature checks shall be performed on pasteurized milk and milk products.

Whenever a phosphatase test is positive, the cause shall be determined. Where the cause is improper pasteurization, it shall be corrected; and any milk or milk product involved shall not be offered for sale.

Samples shall be analyzed at an official or appropriate officially designated laboratory. All sampling procedures and required laboratory *examinations shall be in substantial compliance with the ------ Edition of* Standard Methods for the Examination of Dairy Products *of the American Public Health Association, and the ------ Edition of* Official Methods of Analyses *of the Association of Official Agricultural Chemists. (Insert edition number current at time of adoption). Such procedures and examinations shall be evaluated in accordance with the methods of evaluating milk laboratories recommended by the United States Public Health Service. Examinations and tests shall be conducted to detect adulterants, including pesticides, as the health authority shall require. Assays of vitamin D milk or milk products and/or fortified milk and milk products shall be made at least annually in a laboratory acceptable to the health authority.*

ADMINISTRATIVE PROCEDURES

Enforcement Procedures.—Whenever two of the last four consecutive bacteria counts, coliform determinations, or cooling temperatures, taken on separate days, exceed the limit of the standard for the milk and/or milk product, the health authority shall send a written notice thereof to the person concerned. This notice shall be in effect so long as 2 of the last 4 consecutive samples exceed the limit of the standard. An additional sample shall be taken within 14 days of the sending of such notice, but not before the lapse of 3 days. Immediate suspension of permit in accordance with Section 3 and/or court action shall be instituted whenever the standard is violated by three of the last five bacteria counts, coliform determinations, or cooling temperatures (see App. E, Examples of 3-out-of-5 Compliance Enforcement Procedures).

All violations of bacterial, coliform, and cooling temperatures standards shall be followed promptly by inspection to determine and correct the cause.

Laboratory Techniques.—Procedures for the collection and holding of samples; the selection and preparation of apparatus, media and reagents; and the analytical procedures, incubation, reading, and reporting of results, shall be in substantial compliance with *Standard Methods for the Examination of Dairy Products* and the *Official Methods of Analyses.* The procedures shall be those specified therein for:

(1) Standard plate count at 32° C.
(2) Simplified methods for viable counts of raw milk at 32° C.
(3) Coliform test with solid media at 32° C.
(4) Disc assay methods for antibiotics
(5) APHA or AOAC phosphatase tests

The phosphatase test is an index of the efficiency of the pasteurization process. In the event the laboratory phosphatase test is positive, the cause shall be determined immediately. Where the cause is improper pasteurization, it shall be corrected. When a laboratory phosphatase test is positive, or if any doubt should arise as to the compliance of the equipment, standards or methods outlined in Section 7, item 16p., the health authority should immediately conduct field phosphatase tests at the plant (App. G, p. 134).

The direct microscopic count is useful as a screening test to detect suspicious tanker loads of milk for subsequent official examinations, and to determine the possible presence of abnormal milk.

Sampling Procedures.—When samples of raw milk for pasteurization are taken at a milk plant prior to pasteurization, they shall be drawn following adequate agitation from randomly selected storage tanks.

When bacterial counts are made of several samples of the same milk or milk products collected from the same supply, on the same day, these counts are averaged arithmetically, and the results recorded as the count of the milk or the milk product for that day. All counts should be recorded on the milk-ledger form PHS 1784 (or a similar form) for dairy farms, and form PHS 1782 (or a similar form) for milk plants as soon as reported by the laboratory.

The use of a computer or other information retrieval system may be used.

See Appendix G, page 135, for a reference to antibiotics in milk and the conditions under which a positive phosphatase reaction may be encountered in properly pasteurized milk or cream.

Note.—The industry should be encouraged by the health authority to achieve day-to-day compliance with the foregoing standards by performing tests on each producer's milk, including platform tests for odors, temperature, and sediment. Bacterial counts should be conducted following laboratory pasteurization as a check for thermoduric organisms. Examinations for the presence of psychrophilic bacteria are also recommended. Periodic screening tests for presence of added water, antibiotics, and pesticide residues should be performed on producer milk. Plants should reject milk of abnormal odor and high temperature as well as milk that is found to be unsatisfactory by the sediment test. Followup inspections on the dairy farm should be made by the plant fieldman to determine the cause and to institute corrective measures whenever milk is rejected by the milk plant.

SECTION 7. STANDARDS FOR MILK AND MILK PRODUCTS

All Grade A raw milk for pasteurization and all Grade A pasteurized milk and milk products shall be produced, processed, and pasteur-

ized to conform with the following chemical, bacteriological, and temperature standards, and the sanitation requirements of this section.

No process or manipulation other than pasteurization, processing methods integral therewith, and appropriate refrigeration shall be applied to milk and milk products for the purpose of removing or deactivating microorganisms.

Chemical, Bacteriological, and Temperature Standards for Grade A Milk and Milk Products

Grade A raw milk for pasteurization.	Temperature	Cooled to 50° F., or less and maintained thereat until processed.
	Bacterial limits	Individual producer milk not to exceed 100,000 per ml. prior to commingling with other producer milk. Not exceeding 300,000 per ml. as commingled milk prior to pasteurization.
	Antibiotics	No detectable antibiotic residues.
Grade A pasteurized milk and milk products (except cultured products).	Temperature	Cooled to 45° F., or less and maintained thereat.
	Bacterial limits	Milk and milk products—20,000 per ml.
	Coliform limit	Not exceeding 10 per ml.
	Phosphatase	Less than 1 μg per ml. by Scharer Rapid Method (or equivalent by other means).
Grade A pasteurized cultured products.	Temperature	Same as above.
	Coliform limit	Do.
	Phosphatase	Do.
	Bacterial limits	Exempt.

SANITATION REQUIREMENTS FOR GRADE A RAW MILK FOR PASTEURIZATION

ITEM 1r. ABNORMAL MILK

Cows which show evidence of the secretion of abnormal milk in one or more quarters, based upon bacteriological, chemical, or physical examination, shall be milked last or with separate equipment; and the milk shall be discarded. Cows treated with, or cows which have consumed chemical, medicinal or radioactive agents which are capable of being secreted in the milk and which, in the judgment of the health authority, may be deleterious to human health, shall be milked last or with separate equipment, and the milk disposed of as the health authority may direct.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Milk from cows being treated with medicinal agents, which are capable of being secreted in the milk, is not offered for sale for such period as is recommended by the attending veterinarian or as indicated on the package label of the medicinal agent.

2. Milk from cows treated with or exposed to insecticides not approved for use on dairy cattle by the U.S. Department of Agriculture is not offered for sale.

3. The health authority requires such additional tests for the detection of abnormal milk as he deems necessary (see App. A, p. 94).

4. Bloody, stringy, off-colored milk, or milk that is abnormal to sight or odor, is so handled and disposed of as to preclude the infection of other cows and the contamination of milk utensils.

5. Cows secreting abnormal milk are milked last or in separate equipment which effectively prevents the contamination of the wholesome supply.

6. Equipment, utensils, and containers used for the handling of abnormal milk are not used for the handling of milk to be offered for sale, unless they are first cleaned and effectively sanitized.

ITEM 2r. MILKING BARN, STABLE, OR PARLOR—CONSTRUCTION

A milking barn, stable, or parlor shall be provided on all dairy farms in which the milking herd shall be housed during milking time operations. The areas used for milking purposes shall (1) have floors constructed of concrete or equally impervious material; (2) have walls and ceilings which are smooth, painted or finished in an approved manner, in good repair, ceiling dusttight; (3) have separate stalls or pens for horses, calves, and bulls; (4) be provided with natural and/or artificial light, well distributed for day and/or night milking; (5) provide sufficient air space and air circulation to prevent condensation and excessive odors; (6) not be overcrowded; and (7) have dusttight covered boxes or bins, or separate storage facilities for ground, chopped, or concentrated feed.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. A milking barn, stable, or parlor is provided on all dairy farms.

2. Gutters, floors, and feed troughs are constructed of good quality concrete or equally impervious material. Floors shall be easily cleaned (brushed surfaces permitted) and shall be graded to drain and maintained in good repair and free of excessive breaks or worn areas that may create pools.

3. Walls and ceilings are finished with wood, tile, smooth-surfaced concrete, cement plaster, brick, or other equivalent materials with light colored surfaces. Walls, partitions, doors, shelves, windows, and

ceilings shall be kept in good repair; and surfaces shall be refinished whenever wear or discoloration is evident.

Whenever feed is stored overhead, ceilings shall be constructed to prevent the sifting of chaff and dust into the milking barn, stable or parlor. If a hay opening is provided from loft into the milking portion of the barn, such opening shall be provided with a dusttight door which shall be kept closed during milking operations.

4. Bull pens, maternity and calf stalls, and horse stalls are partitioned from the milking portion of the barn. Such portions of the barn that are not separated by tight partitions shall comply with all requirements of this item.

5. The milking barn is provided with natural and/or artificial light to insure that all surfaces and particularly the working areas will be plainly visible. The equivalent of at least 10 foot-candles of light in all working areas shall be provided.

6. Air circulation is sufficient to minimize odors and to prevent condensation upon walls and ceilings.

7. Overcrowding is not evidenced by the presence of calves, cows, or other barnyard animals in walks or feed alleys. Inadequate ventilation and excessive odors may also be evidence of an overcrowded barn.

8. Dry feed storage rooms and silo approaches are separated from the milking portion of the barn by tight partitions. Direct openings into the milking barn shall have tight-fitting doors which are kept closed. Metal or wooden feed storage containers shall be of tight construction with dusttight covers.

ITEM 3r. MILKING BARN, STABLE, OR PARLOR—CLEANLINESS

The interior shall be kept clean. Floors, walls, windows, pipelines, and equipment shall be free of filth and/or litter, and shall be clean. Swine and fowl shall be kept out of the milking barn.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The interior of the milking barn, stable, or parlor is kept clean.

2. Leftover feed in feed mangers appears fresh and is not wet or soggy.

3. The bedding material, if used, does not contain more manure than has accumulated since the previous milking.

4. Outside surfaces of pipeline systems located in the milking barn, stable, or parlor are reasonably clean.

5. Gutter cleaners are reasonably clean.

6. All pens, calf stalls, and bull pens, if not separated from the milking barn, stable, or parlor, are clean.

7. Swine and fowl are kept out of the milking barn.

ITEM 4r. COWYARD

The cowyard shall be graded and drained and shall have no standing pools of water or accumulations of organic wastes: Provided, *That in loafing or cattle-housing areas, cow droppings and soiled bedding shall be removed, or clean bedding added, at suffiently frequent intervals to prevent the soiling of the cow's udder and flanks. Waste feed shall not be allowed to accumulate. Manure packs shall be properly drained and shall provide a reasonably firm footing. Swine shall be kept out of the cowyard.*

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The cowyard, which is the enclosed or unenclosed area adjacent to the milking barn, in which the cows may congregate, including cattle-housing areas and feed lots, is graded and drained; depressions and soggy areas are filled; cow lanes are reasonably dry.

2. Approaches to the barn door and the surroundings of stock watering and feeding stations are solid to the footing of the animal.

3. Wastes from the barn or milkhouse are not allowed to pool in the cowyard. Cowyards which are muddy due to recent rains should not be considered as violating this item.

4. Manure, soiled bedding, and waste feed are not stored or permitted to accumulate therein in such a manner as to permit the soiling of cows' udders and flanks. Cattle-housing areas (stables without stanchions, such as loose-housing stables, pen stables, resting barns, holding barns, loafing sheds, wandering sheds, free-stall housing) shall be considered a part of the cowyard. Manure packs shall be solid to the footing of the animal (see App. B, p. 95).

5. Cowyards are kept reasonably free of cattle droppings. Cattle droppings shall not be allowed to accumulate in piles that are accessible to the animals.

ITEM 5r. MILKHOUSE OR ROOM—CONSTRUCTION AND FACILITIES

A milkhouse or room of sufficient size shall be provided, in which the cooling, handling, and storing of milk and the washing, sanitizing, and storing of milk containers and utensils shall be conducted.

The milkhouse shall be provided with a smooth floor constructed of concrete or equally impervious material graded to drain and maintained in good repair. Liquid waste shall be disposed of in a sanitary manner; all floor drains shall be accessible and shall be trapped if connected to a sanitary sewer system.

The walls and ceilings shall be constructed of smooth material, in good repair, well painted, or finished in an equally suitable manner.

The milkhouse shall have adequate natural and/or artificial light and be well ventilated.

The milkhouse shall be used for no other purpose than milkhouse operations; there shall be no direct opening into any barn, stable, or into a room used for domestic purposes: Provided, *That a direct opening between the milkhouse and milking barn, stable, or parlor is permitted when a tight-fitting self-closing solid door(s) hinged to be single or double acting is provided.*

Water under pressure shall be piped into the milkhouse.

The milkhouse shall be equipped with a two-compartment wash vat and adequate hot water heating facilities.

When a transportation tank is used for the cooling and storage of milk on the dairy farm, such tank shall be provided with a suitable shelter for the receipt of milk. Such shelter shall be adjacent to, but not a part of, the milkroom and shall comply with the requirements of the milkroom with respect to construction, light, drainage, insect and rodent control, and general maintenance.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. A separate milkhouse of sufficient size is provided for the cooling, handling, and storing of milk and the washing, sanitizing, and storing of milk containers and utensils.
2. The floors of all milkhouses are constructed of good quality concrete (float finish permissible), or equally impervious tile, or brick laid closely with impervious material, or metal surfacing with impervious joints, or other material the equivalent of concrete and maintained free of breaks, depressions, and surface peelings.
3. The floor slopes to drain so that there are no pools of standing water. The joints between the floor and the walls shall be watertight.
4. The liquid wastes are disposed of in a sanitary manner; all floor drains are accessible and are trapped if connected to a sanitary sewer.
5. Walls and ceilings are constructed of smooth dressed lumber or similar material, well painted with a light-colored washable paint, and are in good repair. Surfaces and joints shall be tight and smooth.

Sheet metal, tile, cement block, brick, concrete, cement plaster, or similar materials of light color may be used; the surfaces and joints shall be smooth.

6. A minimum of 20 foot-candles of light is provided at all working areas from natural and/or artificial light for milkhouse operations.

7. Windows and solid doors are closed during dusty weather.

8. The milkhouse is adequately ventilated to minimize odors and condensation on floors, walls, ceilings, and clean utensils.

9. Vents, if installed, and lighting fixtures are located to preclude the contamination of bulk milk tanks or clean utensil storage areas.

10. The milkhouse is used for no other purpose than milkhouse operations.

11. There is no direct opening into any barn, stable, or room used for domestic purposes; except that an opening between the milkhouse and milking barn, stable, or parlor is permitted when a tight-fitting self-closing solid door(s) hinged to be single or double acting is provided.

12. A vestibule is used, it complies with the applicable milkhouse construction requirements.

13. The transfer of milk from a bulk-holding/cooling tank to a transport tank is through a hose port located in the milkhouse wall. The port shall be fitted with a tight door, which shall be in good repair. It shall be kept closed except when the port is in use.

14. Water under pressure is piped into the milkhouse.

15. Each milkhouse is provided with facilities for heating water in sufficient quantity and to such temperatures for the effective cleaning of all equipment and utensils (see App. B, p. 96).

16. The milkhouse is equipped with a wash-and-rinse vat having at least two compartments. Each compartment must be of sufficient size to accommodate the largest utensil or container used. The cleaning-in-place vat for milk pipelines and milk machines may be accepted as one part of the two-compartment vat: *Provided*, That the cleaning-in-place station rack in or on the vat and the milking machine inflations and appurtenances are completely removed from the vat during the washing, rinsing, and/or sanitizing of other utensils and equipment.

17. A suitable shelter is provided for a transportation truck used for cooling and storing milk. Such shelter shall be adjacent to, but not a part of, the milkroom and shall comply with the requirements of the milkroom with respect to construction, light, drainage, insect and rodent control, and general maintenance. See Appendix B, page 95 for suggested plans and information on size, construction, operation, and maintenance of milkhouses.

ITEM 6r. MILKHOUSE OR ROOM—CLEANLINESS

The floors, walls, ceilings, windows, tables, shelves, cabinets, wash vats, non-product contact surfaces of milk containers, utensils, and equipment, and other milkroom equipment shall be clean. Only articles directly related to milkroom activities shall be permitted in the milkroom. The milkroom shall be free of trash, animals, and fowl.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The milkroom structure, equipment, and other milkroom facilities used in its operation or maintenance are clean at all times.
2. Insecticides, rodenticides, antibiotics, medicinals, etc., are not stored in the milkroom.
3. Vestibules, if provided, are kept clean.
4. Animals and fowl are kept out of the milkroom.

ITEM 7r. TOILET

Every dairy farm shall be provided with one or more toilets, conveniently located and properly constructed, operated, and maintained in a sanitary manner. The waste shall be inaccessible to flies and shall not pollute the soil surface or contaminate any water supply.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. There is at least one flush toilet connected to a public sewer system or to an individual sewage-disposal system or a chemical toilet, earth pit privy, or other type of privy. Such sewerage systems shall be constructed and operated in accordance with plans and instructions of the State health authority and comply with the standards outlined in Appendix C.
2. A toilet or privy is convenient to the milking barn and the milkroom. There shall be no evidence of human defecation or urination about the premises.
3. No privy opens directly into the milkroom.
4. The toilet room, including all fixtures and facilities, is kept clean and free of flies and odors.
5. Where flush toilets are used, doors to toilet rooms are tight and self-closing. All outer openings in toilet rooms shall be screened or otherwise protected against the entrance of flies.
6. Vents of earth pits are screened.

ITEM 8r. WATER SUPPLY

Water for milkhouse and milking operations shall be from a supply properly located, protected, and operated, and shall be easily accessible, adequate, and of a safe, sanitary quality.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The water supply for milkhouse and milking operations is approved as safe by the State health authority, and, in the case of individual water systems, complies with the specifications outlined in Appendix D and the bacteriological standards outlined in Appendix G, page 134.

2. No cross-connection exists between a safe water supply and any unsafe or questionable water supply, or any other source of pollution.

3. There are no submerged inlets through which a safe water supply may be contaminated.

4. The well or other source of water is located and constructed in such a manner that neither underground nor surface contamination from any sewerage systems, privy, or other source of pollution can reach such water supply.

5. New individual water supplies and water supply systems which have been repaired or otherwise become contaminated are thoroughly disinfected before being placed in use (see App. D, p. 117). The supply shall be made free of the disinfectant by pumping to waste before any sample for bacteriological testing shall be collected.

6. All containers and tanks used in the transportation of water are sealed and protected from possible contamination. These containers and tanks shall be subjected to a thorough cleaning and a bacteriological treatment prior to filling with potable water to be used at the dairy farm. To minimize the possibility of contamination of the water during its transfer from the potable tanks to the elevated or groundwater storage at the dairy farm, a suitable pump, hose, and fittings shall be provided. When the pump hose and fittings are not being used, the outlets shall be capped and stored in a suitable dustproof enclosure so as to prevent their contamination. The storage tank at the dairy farm shall be constructed of impervious material provided with a dust and rainproof cover, and also provided with an approved-type vent and roof hatch. All new reservoirs or reservoirs which have been cleaned shall be disinfected prior to placing them into service (see App. D, p. 117).

7. Samples for bacteriological examination are taken upon the initial approval of the physical structure based upon the requirements of this *Ordinance* and when any repair or alteration of the water supply system has been made: *Provided*, That when water is hauled to the dairy farm such water shall be sampled for bacteriological examination at the point of use and submitted to a laboratory each month. Bacteriological examinations shall be conducted in a laboratory acceptable to the health authority.

8. Current records of water test results are retained on file with the health authority or as the health authority directs.

ITEM 9r. UTENSILS AND EQUIPMENT—CONSTRUCTION

All multiuse containers, equipment, and utensils used in the handling, storage, or transportation of milk shall be made of smooth, nonabsorbent, corrision-resistant, nontoxic materials, and shall be so constructed as to be easily cleaned. All containers, utensils, and equipment shall be in good repair. All milk pails used for hand milking and stripping shall be seamless and of the hooded type. Multiple-use woven material shall not be used for straining milk. All single-service articles shall have been manufactured, packaged, transported, stored, and handled in a sanitary manner and shall comply with the applicable requirements of item 11p of this section. Articles intended for single-service use shall not be reused.

Farm holding/cooling tanks, welded sanitary piping, and transportation tanks shall comply with the applicable requirements of items 10p and 11p of this section.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The milk-contact surfaces of all multiuse containers, utensils, equipment, piping, and fittings are smooth and constructed of:

a. Stainless steel of the AISI (American Iron and Steel Institute) 300 series, or

b. Equally corrosion-resistant, nontoxic metal; or

c. Heat-resistant glass; or

d. Plastic or rubber and rubberlike materials which are relatively inert, resistant to scratching, scoring, decomposition, crazing, chipping, and distortion, under normal use conditions; are nontoxic, fat resistant, relatively nonabsorbent, relatively insoluble, do not release component chemicals or impart flavor or odor to the product, and which maintain their original properties under repeated-use conditions.

2. Single-service articles have been manufactured, packaged, transported, stored, and handled in a sanitary manner and comply with the applicable requirements of item 11p.

3. Articles intended for single service use are not reused.

4. All containers, equipment, and utensils are free of breaks and corrosion.

5. All joints in such containers, equipment, and utensils are smooth and free from pits, cracks, or inclusions.

6. Cleaned-in-place milk pipelines and return-solution lines are self-draining. If gaskets are used, they shall be self-positioning and of material meeting specifications described in (1) (d) above, and shall be of such design, finish, and application as to form a smooth, flush interior surface. If gaskets are not used, all fittings shall have self-positioning faces designed to form a smooth, flush interior surface. All interior surfaces of welded joints in pipelines shall be smooth and free of pits, cracks, and inclusions.

7. Detailed plans for cleaned-in-place pipeline systems are submitted to the health authority for written approval prior to installation. No alteration or addition shall be made to any milk pipeline system without prior written approval of the health authority.

8. Strainers, if used, are of perforated metal design, or so constructed as to utilize single-service strainer media.

9. Seamless hooded pails having an opening not exceeding one-third the area of that of an open pail of the same size are used.

10. All milking machines, including heads, milk claws, milk tubing, and other milk-contact surfaces can be easily cleaned and inspected.

11. Milk cans have umbrella-type lids.

12. Farm holding/cooling tanks, welded sanitary piping, and transportation tanks comply with the applicable requirements of items 10p and 11p of this section.

Note.—*3-A Sanitary Standards.*—3-A Sanitary Standards for dairy equipment are promulgated jointly by the Sanitary Standards Subcommittee of the Dairy Industry Committee, the Committee on Sanitary Procedure of the International Association of Milk, Food and Environmental Sanitarians, Inc., and the Milk and Food Branch, Division of Environmental Engineering and Food Protection, Public Health Service, Department of Health, Education, and Welfare. Equipment manufactured in conformity with 3-A Sanitary Standards complies with the sanitary design and construction standards of this *Ordinance*.

ITEM 10r. UTENSILS AND EQUIPMENT—CLEANING

The product-contact surfaces of all multiuse containers, equipment, and utensils used in the handling, storage, or transportation of milk shall be cleaned after each usage.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The product-contact surfaces of all multiuse containers, equipment, and utensils used in the handling, storage, or transportation of milk are cleaned after each usage.

ITEM 11r. UTENSILS AND EQUIPMENT—SANITIZATION

The product-contact surfaces of all multiuse containers, equipment, and utensils used in the handling, storage, or transportation of milk shall be sanitized before each usage.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All product-contact surfaces of multiuse containers, utensils, and equipment used in the handling, storage, or transportation of milk are sanitized before each usage by one of the following methods, or by any method which has been demonstrated to be equally effective:

a. Exposure to steam for at least 15 minutes at a temperature of at least 170° F., or for at least 5 minutes at a temperature of at least 200° F., in a steam cabinet equipped with an indicating thermometer which is located in the coldest zone.

b. Exposure to an enclosed jet of steam for not less than 1 minute.

c. Complete immersion in hot water at a temperature of at least 170° F. for at least 5 minutes, or exposure to a flow of hot water at a temperature of at least 170° F. as determined by use of a suitable accurate thermometer (at the outlet) for at least 5 minutes.

d. Exposure to hot air at a temperature of at least 180° F. for at least 20 minutes in a properly designed oven or hot-air cabinet which is equipped with an acceptable indicating thermometer located in the coldest zone.

e. Complete immersion for at least 1 minute in, or exposure for at least 1 minute to a flow of a chemical sanitizer of acceptable strength. All product-contact surfaces must be wetted by the sanitizing solution, and piping so treated must be filled. Sanitizing sprays may be used. Chemical solutions, once used, shall not be reused for sanitizing but may be reused for other purposes.

(See App. F, p. 126, for further discussion of approved sanitizing procedures.)

ITEM 12r. UTENSILS AND EQUIPMENT—STORAGE

All containers, utensils, and equipment used in the handling, storage, or transportation of milk, unless stored in sanitizing solutions, shall be *stored to assure complete drainage, and shall be protected from contamination prior to use.*

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All milk containers, utensils, and equipment, including milking machine vacuum hoses, are stored in the milkhouse in a steam or hot-air cabinet, in a sanitizing solution, or on racks, until used. Pipeline milking systems which are cleaned-in-place may be stored in place when such pipelines and appurtenances terminate in the milkhouse or are closed to the atmosphere during storage.
2. Means are provided to effect complete drainage of equipment when such equipment cannot be stored to drain freely.
3. Clean cans or other containers are stored in the milkhouse within a reasonable time after delivery to the dairy farm.
4. Strainer pads, parchment papers, gaskets, and similar single-service articles are stored in a suitable container or cabinet and protected against contamination.

ITEM 13r. UTENSILS AND EQUIPMENT—HANDLING

After sanitization, all containers, utensils, and equipment shall be handled in such manner as to prevent contamination of any product-contact surface.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Sanitized product-contact surfaces, including farm cooling holding tank openings and outlets, are protected against contact with unsanitized equipment and utensils, hands, clothing, splash, condensation, and other sources of contamination.
2. Any sanitized product-contact surface, which has been otherwise exposed to contamination, is again cleaned and sanitized before being used.

ITEM 14r. MILKING—FLANKS, UDDERS, AND TEATS

Milking shall be done in the milking barn, stable, or parlor. The flanks, udders, bellies, and tails of all milking cows shall be free from visible dirt. All brushing shall be completed prior to milking. The udders and teats of all milking cows shall be cleaned and treated with a sanitizing solution just prior to the time of milking, and shall be relatively dry before milking. Wet hand milking is prohibited.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Milking is done in a milking barn, stable, or parlor.
2. Brushing is completed prior to milking.
3. Flanks, bellies, tails, and udders are clipped as often as necessary to facilitate cleaning of these areas and are free from dirt.
4. Udders and teats of all milking cows are cleaned and treated with a sanitizing solution and are relatively dry just prior to milking.
5. Wet hand milking is prohibited.

ITEM 15r. MILKING—SURCINGLES, MILK STOOLS, AND ANTIKICKERS

Surcingles, milk stools, and antikickers shall be kept clean and stored above the floor.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Milk stools are not padded and are constructed to be easily cleaned.

2. Milk stools, surcingles, and antikickers are kept clean and are stored above the floor in a clean place, either in the milking barn, stable, parlor, or milkhouse, when not in use.

ITEM 16r. MILKING—TRANSFER AND PROTECTION OF MILK

Each pail or container of milk shall be transferred immediately from the milking barn, stable, or parlor to the milkhouse. No milk shall be strained, poured, transferred, or stored unless it is properly protected from contamination.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The receiving receptacle is raised above the floor (as on a dolly or cart), or placed at a distance from the cows to protect it against manure and splash when milk is poured and/or strained in the milking barn. Such receptacle shall have a tight-fitting cover which shall be closed except when milk is being poured.
2. Each pail or container of milk is transferred immediately from the milking barn, stable, or parlor to the milkhouse.
3. Pails, cans, and other equipment containing milk are properly covered during transfer and storage.

ITEM 17r. PERSONNEL—HAND-WASHING FACILITIES

There shall be provided adequate hand-washing facilities, including running water, soap or detergent, and individual sanitary towels, in the milkhouse and in or convenient to the milking barn, stable, or parlor.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Hand-washing facilities are located in the milkhouse and in or convenient to the milking barn, stable or parlor.

2. Hand-washing facilities include soap or detergent, running water, individual sanitary towels, and a lavatory fixture or separate water tap. Utensil wash and rinse vats shall not be considered as hand-washing facilities.

ITEM 18r. PERSONNEL—CLEANLINESS

Hands shall be washed clean and dried with an individual sanitary towel immediately before milking, before performing any milkhouse function, and immediately after the interruption of any of these activities. Milkers and milk haulers shall wear clean outer garments while milking or handling milk, milk containers, utensils, or equipment.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Hands are washed clean and dried with an individual sanitary towel immediately before milking, before performing any milkhouse function, and immediately after the interruption of any of these activities.

2. Milkers and milk haulers wear clean outer garments while milking or handling milk, milk containers, utensils, or equipment.

ITEM 19r. COOLING

Raw milk for pasteurization shall be cooled to 50° F. or less within 2 hours after milking and shall be maintained at that temperature until delivered.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Raw milk for pasteurization is cooled to 50° F. or less within 2 hours after milking and maintained at that temperature until delivered.

ITEM 20r. VEHICLES

Vehicles used to transport milk in cans from the dairy farm to the milk plant or receiving station shall be constructed and operated to protect their contents from sun, freezing, and contamination. Such vehicles shall be kept clean, inside and out; and no substance capable of contaminating milk shall be transported with milk.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Vehicles used to transport milk in cans from the dairy farm to the milk plant or receiving station are constructed and operated to protect their contents from sun, freezing, and contamination.
2. Vehicles have bodies with solid enclosures and tight, solid doors.
3. Vehicles are kept clean, inside and out.
4. No substance capable of contaminating the milk is transported with the milk.

See items 9r and 10r for information on the construction of transportation tanks.

ITEM 21r. INSECT AND RODENT CONTROL

Effective measures shall be taken to prevent the contamination of milk, containers, equipment, and utensils by insects and rodents, and by chemicals used to control such vermin. Milkrooms shall be free of insects and rodents. Surroundings shall be kept neat, clean, and free of conditions which might harbor or be conducive to the breeding of insects and rodents.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Surroundings are kept neat, clean, and free of conditions which might harbor or be conducive to the breeding of insects and rodents. During fly season, manure shall be spread directly on the fields; or stored for not more than 4 days in a pile on the ground surface, and then spread on the fields; or stored for not more than 7 days in an impervious-floored bin, or on an impervious-curbed platform and then spread; or stored in a tight-screened and trapped manure shed; or effectively treated with larvicides; or disposed of in any other manner which controls insect breeding.
2. Manure packs in loafing areas, stables without stanchions, pen stables, resting barns, wandering sheds, and free-stall housing are properly bedded and managed to prevent fly breeding.

3. Milkrooms are free of insects and rodents.

4. Milkrooms are effectively screened or otherwise protected against the entrance of vermin.

5. Outer milkhouse doors are tight and self-closing. Screen doors shall open outward.

6. Effective measures are taken to prevent the contamination of milk, containers, utensils, and equipment by insects and rodents, and by chemicals used to control such vermin.

7. Only pesticides approved for use by the health authority and/or registered with the U.S. Department of Agriculture are used for insect and rodent control. (See App. B, p. 98, for further information about insect and rodent control.)

8. Pesticides are used only in accordance with manufacturer's directions and are used so as to prevent the contamination of milk, milk containers, equipment, utensils, feed, and water.

Note.—A convenient inspection form for producer dairy farms, which summarizes the applicable sanitation requirements, is found in Appendix L, page 168.

SANITATION REQUIREMENTS FOR GRADE A PASTEURIZED MILK AND MILK PRODUCTS

A receiving station shall comply with items 1p to 15p, inclusive, and 17p, 20p, and 22p, except that the partitioning requirement of item 5p shall not apply.

A transfer station shall comply with items 1p, 4p, 6p, 7p, 8p, 9p, 10p, 11p, 12p, 14p, 15p, 20p, and 22p; and as climatic and operating conditions require, the applicable provisions of items 2p and 3p: Provided, *That in every case, overhead protection shall be provided. Facilities for the cleaning and sanitizing of bulk transport tanks shall comply with items 1p, 4p, 6p, 7p, 8p, 9p, 10p, 11p, 12p, 14p, 15p, 20p, and 22p; and as climatic and operating conditions require, the applicable provisions of items 2p and 3p:* Provided, *That in every case, overhead protection shall be provided.*

ITEM 1p. FLOORS—CONSTRUCTION

The floors of all rooms in which milk or milk products are processed, handled, or stored, or in which milk containers, equipment, and utensils are washed, shall be constructed of concrete or other equally impervious and easily cleaned material; and shall be smooth, properly sloped, provided with trapped drains, and kept in good repair: Provided, *That cold-storage rooms used for storing milk and milk products need not be provided with floor drains when the floors are sloped to drain to one or more exits:* Provided further, *That storage rooms* *for storing dry ingredients and/or packaging materials need not be provided with drains: and the floors may be constructed of tightly joined wood.*

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The floors of all rooms in which milk is handled, processed, or stored, or in which milk containers or utensils are washed, are constructed of good quality concrete, or equally impervious tile or brick laid closely with impervious joint material, or metal surfacing with impervious joints, or other material which is the equivalent of good quality concrete. The floors of storage rooms for dry ingredients and/or packaging materials may be constructed of tightly joined wood.

2. The floor surface is smooth and sloped, so that there are no pools of standing water after flushing; and the joints between the floor and the walls are impervious.

3. The floors are provided with trapped drains. Cold-storage rooms used for storing milk and milk products need not be provided with floor drains when the floors are sloped to drain to one or more exits. Storage rooms for dry ingredients and/or packaging materials need not be provided with drains.

ITEM 2p. WALLS AND CEILINGS—CONSTRUCTION

Walls and ceilings of rooms in which milk or milk products are handled, processed, or stored, or in which milk containers, utensils, and equipment are washed, shall have a smooth, washable, light-colored surface, in good repair.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Walls and ceilings are finished with smooth, washable, light-colored painted wood, tile, smooth-surface concrete, cement plaster, brick, or other equivalent materials with washable, light-colored surfaces.

2. Walls, partitions, windows, and ceilings are kept in good repair and refinished as often as the finish wears off or becomes discolored.

ITEM 3p. DOORS AND WINDOWS

Effective means shall be provided to prevent the access of flies and rodents. All openings to the outside shall have solid doors or glazed windows which shall be closed during dusty weather.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All openings to the outer air are effectively screened by (a) screening; or (b) effective electric screen panels; or (c) fans or air curtains which provide sufficient air velocity so as to prevent the entrance of flies; or (d) properly constructed flaps where it is impractical to use self-closing doors or air curtains; or (e) any effective combination of (a), (b), (c), or (d), or by any other method which prevents the entrance of flies.
2. All outer doors are tight and self-closing. Screen doors shall open outward.
3. All outer openings are rat proofed to the extent necessary to prevent the entry of rodents.

Note.—The evidence of insects and/or rodents in the plant shall be considered under Item 9p.

ITEM 4p. LIGHTING AND VENTILATION

All rooms in which milk and milk products are handled, processed, or stored and/or in which milk containers, equipment, and utensils are washed shall be well lighted and well ventilated.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Adequate light sources are provided (natural, artificial, or a combination of both) which furnish at least 20 foot-candles of light in all working areas. This shall apply to all rooms where milk or milk products are handled, processed, or stored, or where utensils, containers, and/or equipment are washed. Dry storage and cold storage rooms shall be provided with at least 5 foot-candles of light.
2. Ventilation in all rooms is sufficient to keep them reasonably free of odors and excessive condensation on equipment, walls, and ceilings.
3. Pressurized ventilating systems, if used, have a filtered air intake.

ITEM 5p. SEPARATE ROOMS

There shall be separate rooms for (1) pasteurizing, processing, cooling, and packaging; and (2) cleaning of milk cans and bottles. In addition, plants receiving milk in bulk transport tanks shall provide for cleaning and sanitizing facilities.

Unless all milk and milk products are received in bulk transport tanks, a receiving room, separate from rooms (1) and (2) above, shall be required. Rooms in which milk or milk products are handled, processed, or stored, or in which milk containers, utensils, and equipment are washed or stored, shall not open directly into any stable or any room used for domestic purposes.

ADMINISTRATIVE PROCEDURES [8]

This item is deemed to be satisfied when:

1. Pasteurizing, processing, cooling and packaging are conducted in a single room(s), but not in the same room(s) used for the cleaning of milk cans and bottles. All rooms shall be of sufficient size for their intended purposes.

2. All bulk milk storage tanks are vented into a room used for pasteurization, processing, cooling, or packaging operations, or into a storage tank galley room, provided that vents located elsewhere which are adequately equipped with air filters so as to preclude the contamination of the milk, shall be considered satisfactory.

3. Doors installed in required partitions are self-closing.

4. Facilities for the cleaning and sanitizing of bulk transport tanks are properly equipped for manual and/or mechanical operations. When such facilities are not provided on the plant premises, these operations shall be performed at a receiving station, transfer station, or separate tank washing installation. (Items relating to facilities for cleaning and sanitizing bulk transport tanks are listed on p. 55.)

5. Rooms in which milk or milk products are handled, processed, or stored, or in which milk containers, utensils, and equipment are washed or stored, do not open directly into any stable or any room used for domestic purposes.

ITEM 6p. TOILET-SEWAGE DISPOSAL FACILITIES

Every milk plant shall be provided with toilet facilities conforming with the ordinances of the ------------ of ------------.[1] *Toilet rooms shall not open directly into any room in which milk and/or milk products are processed. Toilet rooms shall be completely enclosed and shall have tight-fitting, self-closing doors. Dressing rooms, toilet rooms, and fixtures shall be kept in a clean condition, in good repair,*

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[8] Communities desiring to regulate cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should include the following in the administrative procedures of item 5p.: Cottage cheese vats shall be located in a separate room, maintained free from flies and other vermin, and kept in a clean condition: *Provided*, That in existing installations, cottage cheese vats may be located in the processing room when there is no evidence of overcrowding, excessive traffic, condensation, or splash. Cottage cheese vats located in processing rooms shall be equipped with multi-service or single-service covers which shall be kept in place at all times during the "setting" operation.

and shall be well ventilated and well lighted. Sewage and other liquid wastes shall be disposed of in a sanitary manner.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. The milk plant is provided with toilet facilities conforming with the ordinances of the ____________ of ____________.[1]

2. Toilet rooms do not open directly into any room in which milk and/or milk products are processed.

3. Toilet rooms are completely enclosed and have tight-fitting self-closing doors.

4. Dressing rooms, toilet rooms, and fixtures are kept in a clean condition, in good repair, and are well ventilated and well lighted.

5. Toilet tissue and easily cleanable covered waste receptacles are provided in toilet rooms.

6. All plumbing is installed to meet the applicable provisions of the State or local plumbing code.

7. Sewage and other liquid wastes are disposed of in a sanitary manner.

8. Non-water-carried sewage disposal facilities are not used, except where the health authority determines that the use of water-carried-sewage facilities is impractical.

9. A chemical toilet, earth pit privy, other type privy, or sewage-disposal facilities is provided. They shall be constructed and operated in accordance with plans and instructions of the health authority. Such facilities shall comply with the standards outlined in Appendix C.

ITEM 7p. WATER SUPPLY

Water for milk plant purposes shall be from a supply properly located, protected, and operated and shall be easily accessible, adequate, and of a safe, sanitary quality.

ADMINISTRATIVE PROCEDURES[b]

This item is deemed to be satisfied when:

1. Water for milk plant purposes is from an adequate supply, properly located, protected, and operated. It shall be easily accessible and of a safe, sanitary quality.

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[b] Communities desiring to regulate cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should include the following in the administrative procedures of item 7p.: "Water supply outlets are provided immediately available to the cottage cheese vats. The hose for transport of water for washing cottage cheese curd shall be arranged in such a way as to preclude the possibility of the hose touching the floor or the product."

2. The water supply is approved as safe by the State health authority, and, in the case of individual water systems, complies with at least the specifications outlined in Appendix D and the bacteriological standards in Appendix G, page 134.

3. There is no cross-connection between the safe water supply and any unsafe or questionable water supply, or any source of pollution through which the safe water supply might become contaminated. A connection between the water supply piping and a make-up tank (such as for cooling or condensing), unless protected by an air gap or effective backflow preventor, constitutes a violation of this requirement.

4. Condensing water for milk evaporators, and water used to produce vacuum and/or to condense vapors in vacuum heat processing equipment, is from a source complying with 2 above: *Provided*, That when approved by the health authority, water from sources not complying with 2 above may be used when the evaporator or vacuum heat equipment is constructed and operated to preclude contamination of such equipment or its contents by condensing water or by water used to produce vacuum. (Appendix D describes means of precluding contamination when noncomplying sources of water are used.)

5. New individual water supplies and water supply systems, which have been repaired or otherwise become contaminated, are disinfected before being placed in use (see App. D, p. 117). The supply shall be made free of the disinfectant by pumping to waste before any sample for bacteriological testing shall be collected.

6. Samples for bacteriological testing of individual water supplies are taken upon the initial approval of the physical structure, semiannually thereafter, and when any repair or alteration of the water supply system has been made. Bacteriological examinations shall be conducted in a laboratory acceptable to the health authority.

7. Current records of water test results are retained on file with the health authority or as the health authority directs.

ITEM 8p. HAND-WASHING FACILITIES

Convenient hand-washing facilities shall be provided, including hot and cold and/or warm running water, soap, and individual sanitary towels or other approved hand-drying devices. Hand-washing facilities shall be kept in a clean condition and in good repair.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Convenient hand-washing facilities are provided, including hot and cold and/or warm running water, soap, and individual sanitary towels or other approved hand-drying devices.

2. Hand-washing facilities are convenient to all toilets and to all rooms in which milk plant operations are conducted.

3. Hand-washing facilities are kept in a clean condition and in good repair.

4. Steam-water mixing valves and vats used for washing bottles, cans, and similar equipment are not used as hand-washing facilities.

ITEM 9p. MILK PLANT CLEANLINESS

All rooms in which milk and milk products are handled, processed, or stored, and/or in which containers, utensils, or equipment are washed or stored, shall be kept clean, neat, and free of evidence of insects and rodents. Pesticides shall be safely used. Only equipment directly related to processing operations or to handling of containers, utensils, and equipment shall be permitted in the pasteurizing, processing, cooling, packaging, and bulk milk storage rooms.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Only equipment directly related to processing operations or the handling of containers, utensils, and equipment is permitted in the pasteurizing, processing, cooling, packaging, and bulk milk storage rooms.

2. All piping, floors, walls, ceilings, fans, shelves, tables, and the nonproduct-contact surfaces of other facilities and equipment are clean.

3. No trash or solid waste is stored within the plant, except in covered containers. Waste containers at the packaging machine or bottle washer may be uncovered during operation of such equipment.

4. All rooms in which milk and milk products are handled, processed, or stored, and/or in which containers, utensils, or equipment are washed or stored, are kept clean, neat, and free of evidence of insects and rodents.

5. Pesticides are used safely.

6. Only pesticides approved by the health authority and/or registered with the U.S. Department of Agriculture shall be used for

insect and rodent control. Such pesticides shall be used only in accordance with the manufacturers' directions and shall be prevented from contaminating milk, containers, equipment, and utensils.

ITEM 10p. SANITARY PIPING

All sanitary piping, fittings, and connections which are exposed to milk and milk products, or from which liquids may drip, drain, or be drawn into milk or milk products, shall consist of smooth, impervious, corrosion-resistant, nontoxic, easily cleanable material. All piping shall be in good repair. Pasteurized milk and milk products shall be conducted from one piece of equipment to another only through sanitary piping.[1]

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All sanitary piping, fittings, and connections which are exposed to milk and milk products, or from which liquids may drip, drain, or be drawn into milk products, consist of smooth, impervious, corrosion-resistant, nontoxic, easily cleanable material.

2. All sanitary piping, connections, and fittings consist of:

a. Stainless steel of the AISI (American Iron and Steel Institute) 300 series, or

b. Equally corrosion-resistant metal which is nontoxic and nonabsorbent, or

c. Heat resistant glass, or

d. Plastic, or rubber and rubberlike materials which are relatively inert, resistant to scratching, scoring, decomposition, crazing, chipping, and distortion under normal use conditions; which are nontoxic, fat resistant, relatively nonabsorbent; which do not impart flavor or odor to the products; and which maintain their original properties under repeated use conditions.

3. Sanitary piping, fittings, and connections are designed to permit easy cleaning, kept in good repair, and free of breaks or corrosion.

4. All interior surfaces of demountable piping, including valves, fittings, and connections are designed, constructed, and installed to permit inspection and drainage.

5. All cleaned-in-place milk pipelines and return-solution lines are rigid, self-draining, and so supported to maintain uniform slope and alinement. Return solution lines shall be constructed of material meet-

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[1] Communities desiring to regulate cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should add the following: "*Provided,* That cottage cheese, cheese dressings, or cheese ingredients may be transported by other methods which protect the product from contamination."

ing the specifications of 2 above. If gaskets are used, they shall be self-positioning, of material meeting the specifications outlined in 2d above, and designed, finished, and applied to form a smooth, flush interior surface. If gaskets are not used, all fittings shall have self-positioning faces designed to form a smooth, flush interior surface. All interior surfaces of welded joints in pipelines shall be smooth and free from pits, cracks, or inclusions.

In the case of welded lines, all welds shall be inspected by the use of a borescope or other appropriate available inspection device as they are made; and such welds shall be approved by the health authority.

Each cleaning circuit shall have access points for inspection in addition to the entrances and exits. These may be valves, removable sections, fittings, or other means or combinations that are adequate for inspection of the interior of the line. These access points shall be located at sufficient intervals to determine the general condition of the interior surfaces of the line.

Detailed plans for welded pipeline systems shall be submitted to the health authority for written approval prior to installation. No alteration or addition shall be made to any welded milk pipeline system without prior written approval from the health authority.

6. Pasteurized milk and milk products are conducted from one piece of equipment to another only through sanitary milk piping. The health authority may waive this piping requirement for specific milk products when small quantities are handled as to make the requirement impractical, and when such handling is performed so as to preclude product contamination.

ITEM 11p. CONSTRUCTION AND REPAIR OF CONTAINERS AND EQUIPMENT

All multiuse containers and equipment with which milk or milk products come into contact shall be of smooth, impervious, corrosion-resistant, nontoxic material; shall be constructed for ease of cleaning; and shall be kept in good repair. All singe-service containers, closures, gaskets, and other articles with which milk or milk products come in contact shall be nontoxic, and shall have been manufactured, packaged, transported, and handled in a sanitary manner. Articles intended for single-service use shall not be reused.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All multiuse containers and equipment with which milk or milk products come into contact are of smooth, impervious, corrosion-resistant, and nontoxic material.

2. All milk-contact surfaces of multiuse containers and equipment consist of:

a. Stainless steel of the AISI (American Iron and Steel Institute) 300 series, or

b. Equally corrosion resistant metal which is nontoxic and nonabsorbent, or

c. Heat resistant glass, or

d. Plastic or rubber and rubberlike materials which are relatively inert, resistant to scratching, scoring, decomposition, crazing, chipping, and distortion under normal use conditions; which are nontoxic, fat resistant, relatively nonabsorbent, and do not impart flavor or odor to the product; and which maintain their original properties under repeated use conditions.

3. All joints in containers, equipment, and utensils are flush and finished as smooth as adjoining surfaces. Where a rotating shaft is inserted through a surface with which milk or milk products come into contact, the joint between the moving and stationary surfaces shall be close-fitting. Where a thermometer or temperature sensing element is inserted through a surface with which milk or milk products come into contact, a pressure-tight seal shall be provided ahead of all threads and crevices.

4. All openings in covers of tanks, vats, separators, etc., are protected by raised edges, or otherwise to prevent the entrance of surface drainage. Condensation-diverting aprons shall be provided as close to the tank or vat as possible on all pipes, thermometers, or temperature sensing elements, and other equipment extending into a tank, bowl, vat, or distributor, unless a watertight joint is provided.

5. All surfaces with which milk or milk products come into contact are easily accessible or demountable for manual cleaning or are designed for mechanical cleaning. All product-contact surfaces shall be readily accessible for inspection and shall be self-draining. Wing nuts, bayonet locks, and similar devices shall be used whenever possible in lieu of bolts and nuts, to promote easy disassembly.

6. There are no threads used in contact with milk or milk products except where needed for functional and safety reasons, such as in clarifiers, pumps, and separators. Such threads shall be of a sanitary type.

7. All multiuse containers and other equipment have rounded corners, are in good repair and free from breaks, crevices, and corrosion. Milk cans shall have umbrella-type covers.

8. Strainers, if used, are of perforated metal design, and so constructed as to utilize single-service strainer media. Multiple-use woven material shall not be used for straining milk.

9. All single-service containers, closures, gaskets, and other articles, with which milk or milk products come in contact, are nontoxic.

10. The manufacture, packing, transportation, and handling of single-service containers, closures, caps, gaskets, and similar articles comply with the requirements of Appendix J, Sanitation Guidelines for the Manufacture of Single-Service Containers for Milk and Milk Products, prepared by the Division of Environmental Engineering and Food Protection of the U.S. Public Health Service. Inspections and tests shall be made by the health authority or by any agency authorized by him.

Note.—*3-A Sanitary Standards.*—3-A Sanitary Standards for Dairy equipment are promulgated jointly by the Sanitary Standards Subcommittee of the Dairy Industry Committee, the Committee on Sanitary Procedure of the International Association of Milk, Food, and Environmental Sanitarians, Inc., and the Milk and Food Branch, Division of Environmental Engineering and Food Protection, Public Health Service, Department of Health, Education, and Welfare. Equipment manufactured in conformity with 3-A Sanitary Standards complies with the sanitary design and construction standards of this *Ordinance.*

ITEM 12p. CLEANING AND SANITIZING OF CONTAINERS AND EQUIPMENT

The product-contact surfaces of all multiuse containers, utensils, and equipment used in the transportation, processing, handling, and storage of milk and milk products shall be effectively cleaned and shall be sanitized before each use.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All multiuse containers and utensils are thoroughly cleaned after each use, and all equipment is thoroughly cleaned at least once each day used: *Provided,* That storage tanks shall be cleaned when emptied and shall be emptied at least every 72 hours.

2. Pipelines and/or equipment designed for mechanical cleaning meet the following requirements:

a. An effective cleaning and sanitizing regimen for each separate cleaning circuit shall be followed.

b. During processing, pipelines and equipment used to contain or conduct milk and milk products shall be effectively separated from tanks or circuits containing cleaning and/or sanitizing solutions.

c. A temperature recording device, complying with the specifications in Appendix H, page 152, shall be installed in the return solution line to record the temperature and time during which the line or equipment is exposed to cleaning and sanitizing.

d. Temperature recording charts shall be identified, dated, and retained for 3 months.

e. During each official inspection, the health authority shall examine and initial temperature recording charts to verify the time of exposure to solutions and their temperatures.

3. Plants in which containers are washed manually are equipped with a two-compartment wash-and-rinse vat for this purpose. Such plants shall also provide a steam cabinet or individual steam-jet plate with hood for sanitizing of cleaned containers, or, if sanitizing is done with chemicals, a third treatment vat.

4. All multiuse containers, equipment, and utensils are sanitized before use, employing one or a combination of the methods prescribed under item 11r. Assembled equipment must be sanitized immediately prior to each day's run. At least once each 3 months, the health authority shall determine the efficiency of sanitization in compliance with the procedures of Appendix G, page 134. (See App. F, p. 127, for a more complete discussion of sanitizers and sanitizing techniques.)

5. The residual bacteria count of multiuse and single-service containers used for packaging pasteurized milk and milk products shall not exceed one per ml. of capacity or not over 50 colonies per 8 square inches (one per square centimeter) of product-contact surface in 3-out-of-4 samples taken at random on a given day. All multiuse and single-service containers shall be free of coliform organisms.

ITEM 13p. STORAGE OF CLEANED CONTAINERS AND EQUIPMENT

After cleaning, all multiuse milk or milk product containers, utensils, and equipment shall be transported and stored to assure complete drainage, and shall be protected from contamination before use.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All multiuse containers, equipment, and utensils, after cleaning, are transported and/or stored on metal racks or in clean cases elevated above the floor. Containers shall be stored inverted on racks or in cases constructed of relatively nonabsorbent, corrosion-resistant, nontoxic materials, or otherwise protected from contamination.

2. Floors are not flushed or washed when crates of clean bottles are stacked on them.

ITEM 14p. STORAGE OF SINGLE-SERVICE CONTAINERS, UTENSILS AND MATERIALS

Single-service caps, cap stock, parchment paper, containers, gaskets, and other single-service articles for use in contact with milk and milk products shall be purchased and stored in sanitary tubes, wrappings, or cartons; shall be kept therein in a clean, dry place until used; and shall be handled in a sanitary manner.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Single-service caps, cap stock, parchment paper, containers, gaskets, and other single-service articles for use in contact with milk and milk products are purchased and stored in sanitary tubes, wrappings, or cartons; are kept in a clean, dry place until used; and are handled in a sanitary manner.

2. Paperboard containers used to enclose plastic bags are used only once.

3. Tubes or cartons are not refilled with spilled caps, gaskets, or parchment papers.

4. Cartons or boxes from which contents have been partially removed are kept closed.

5. Suitable cabinets are provided for storage of tubes after removal from the large outer box, and for storage of opened cartons, unless other satisfactory means are approved by the health authority.

ITEM 15p. PROTECTION FROM CONTAMINATION

Milk plant operations, equipment, and facilities shall be located and conducted to prevent any contamination of milk or milk products, ingredients, equipment, containers, and utensils. All milk or milk products or ingredients which have been spilled, overflowed, or leaked shall be discarded. The processing or handling of products other than milk and milk products in the pasteurization plant shall be performed to preclude the contamination of such milk and milk products.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Equipment and operations are so located within the plant as to prevent overcrowding and contamination of cleaned and sanitized containers, equipment, and utensils by splash, condensation, or manual contact.

2. All milk and milk products which have overflowed, leaked, been spilled, or improperly handled are discarded. Milk and milk products drained from processing equipment at the end of a run, or collected from a defoamer system which does not continuously return such product to the filler bowl, shall be repasteurized only if such milk or milk products are handled in a sanitary manner and maintained at 45° F. or less. When the handling and/or refrigeration of such milk and milk products are not in compliance with this requirement, they shall be discarded. Returned packaged milk and milk products shall not be repasteurized for Grade A use.

3. All product contact surfaces of containers, equipment, and utensils are covered or otherwise protected to prevent the access of insects, dust, condensation, and other contamination. All openings, including valves and piping attached to milk storage and transport tanks, pumps, or vats, etc., shall be capped or otherwise properly protected. The application of suitable filters to the manholes of transport tanks during unloading shall be considered satisfactory.

Receiving and dump vats shall be completely covered, except during washing and sanitizing, and when milk is being dumped. Where strainers are used, the cover for the vat opening shall be designed to cover the opening with the strainer in place.

4. Whenever air under pressure is used for the agitation or movement of milk, or is directed at a milk-contact surface, it is free of oil, dust, rust, excessive moisture, extraneous materials, and odor, and shall otherwise comply with the applicable standards of Appendix H. The use of steam containing toxic substances is expressly prohibited. Whenever steam is used in contact with milk or milk products, it shall be of culinary quality and shall comply with the applicable standards of Appendix H.

5. Standardization is done before the pasteurization process is started, unless pasteurized milk or milk products are used for standardization. Such pasteurized milk products shall be protected against contamination. In no case shall pasteurized milk or milk products be standardized with unpastuerized milk unless the standardized product is subsequently pasteurized. Standardization of Grade A milk and milk products with milk and milk products of other than Grade A quality is prohibited. This *Ordinance* permits standardization as a process of adjusting the butterfat of milk in a milk plant by the addition or removal of cream or skim milk.

6. The processing of foods and/or drinks other than Grade A milk and milk products are performed to preclude the contamination of such milk and milk products.

7. Means are provided to prevent contamination of milk containers, utensils, and equipment by drippings, spillage, and splash from overhead piping, platforms, or mezzanines.

8. All ingredients and nonproduct-contact materials used in the preparation or packaging of milk and milk products are stored in a clean place and are so handled as to prevent their contamination.

9. Pasteurized milk is not strained or filtered except through a perforated metal strainer. Multiple-use woven material shall not be used for straining milk.

ITEM 16p. PASTEURIZATION

Pasteurization shall be performed as defined in Section 1, Definition (S), of this Ordinance.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All milk or milk products are heated to at least 145° F. and are held continuously at or above this temperature for at least 30 minutes, or to at least 161° F. and held continuously at or above this temperature for at least 15 seconds in properly designed and operated equipment which is approved by the health authority: *Provided*, That milk products which have a higher milkfat content than milk and/or contain added sweeteners shall be heated to at least 150° F. and held continuously at or above this temperature for at least 30 minutes, or to at least 166° F. and held continuously at or above this temperature for at least 15 seconds: *Provided further*, That nothing in this definition shall be construed as barring any other pasteurization process which has been recognized by the United States Public Health Service to be equally efficient and which is approved by the State health authority.

2. The design and the operation of pasteurization equipment and all appurtenances thereto comply with the applicable specifications and operational procedures of subitems (A) through (D), as follows:

16p(A). BATCH PASTEURIZATION

All indicating and recording thermometers used in connection with the batch pasteurization of milk or milk products shall comply with the applicable specifications set forth in Appendix H. (Specifications for test thermometers and other test equipment appear in App. H, p. 153.)

1. *Time and Temperature Controls for Batch Pasteurizers*

a. Temperature Difference.—The pasteurizer shall be so designed that the simultaneous temperature difference between the milk or milk product at the center and the coldest milk or milk product in the vat will not exceed 1° F. at any time during the holding period.

The vat shall be provided with adequate agitation, operating throughout the holding period. No batch of milk or milk product shall be pasteurized unless it covers a sufficient area of the agitator to insure adequate agitation.

b. Location and Required Readings of Indicating and Recording Thermometers.—Each batch pasteurizer shall be equipped with both an indicating and a recording thermometer.

The thermometers shall read not less than the required pasteurization temperature throughout the required holding period. The plant operator shall check daily the temperature shown by the recording thermometer against the temperature shown by the indicating thermometer; this comparison shall be noted on the recording thermometer chart. The recording thermometer shall not read higher than the indicating thermometer. No batch of milk or milk products shall be pasteurized unless it is sufficient to cover the bulbs of both the indicating and the recording thermometers.

c. Insurance of Minimum Holding Periods.—Batch pasteurizers shall be so operated that every particle of milk or milk product will be held at not less than the minimum pasteurization temperature continuously for at least 30 minutes. When milk or milk products are raised to pasteurization temperature in the vat, and cooling is begun in the vat, simultaneously with or before the opening of the outlet valve, the recorder chart shall show at least 30 minutes at not less than minimum pasteurization temperature. When milk or milk products are preheated to pasteurization temperature before entering the vat, the recorder chart shall show a holding period of at least 30 minutes at not less than the minimum pasteurization temperature plus the time of filling from the level of the recorder bulb. When cooling is begun in the holder after the opening of the outlet valve, or is done entirely outside the holder, the chart shall show at least 30 minutes at not less than the minimum pasteurization temperature plus the time of emptying to the level of the recording-thermometer bulb.

When the recorder time interval on the recorder chart at the pasteurization temperature includes filling and/or emptying time, such intervals shall be indicated on the recorder chart by the operator, by removing the recording-thermometer bulb from the milk for a sufficient time to depress the pen, or by turning cold water into the vat jacket at the end of the holding period, or by inscribing the holding time on the chart. The filling time and the emptying time for each holder so operated shall be determined by the health authority, initially and after any change which may affect these times.

No milk shall be added to the holder after the start of the holding period.

2. *Airspace Heating*

a. Means shall be provided and used in batch pasteurizers to keep the atmosphere above the milk and milk products at a temperature not less than 5° F. higher than the minimum required temperature of pasteurization during the holding period (App. H, p. 146).

b. Each batch pasteurizer shall be equipped with an airspace thermometer. The surface of the milk or milk product shall be at least 1 inch below the bottom of the thermometer bulb when the bat is in operation.

c. The temperature shown by the airspace thermometer shall be recorded on the recording thermometer chart each time the pastuerizer is in operation.

3. *Inlet and Outlet Valves and Connections*

a. The following definitions shall apply to inlet and outlet valves and connections:

(1) "Valve stop" shall mean a guide which permits turning the valve plug to, but not beyond, the fully closed position.

(2) "90° stop" shall mean a stop so designed as to prevent turning the plug more than 90°.

(3) "120° stop" shall mean a stop which prevents turning the plug more than 120°.

(4) "180° stop" shall mean a stop which prevents turning the plug more than 180°, but which permits two fully closed positions, each diametrically opposite the other.

(5) "Valve with an irreversible plug" shall mean one in which the plug cannot be reversed in the shell.

(6) "Single-quadrant stop" shall mean a 90° stop in a valve with an irreversible plug.

(7) "The fully open position" shall mean that position of the valve seat which permits the maximum flow into or out of the pasteurizer.

(8) "The closed position" shall mean any position of the valve seat which stops the flow of milk into or out of the pasteurizer.

(9) "The fully closed position" shall mean that closed position of the valve seat which requires the maximum movement of the valve to reach the fully open position.

(10) "The just-closed position" shall mean that closed position of a plug-type valve in which the flow into or out of the holder is barely stopped, or any closed position within five sixty-fourths inch thereof as measured along the maximum circumference of the valve seat.

(11) "Leakage" shall mean the entrance of unpasteurized milk into a batch pasteurizer during the holding or emptying period, or the entrance of unpasteurized milk into any pasteurized milk line at any time.

(12) "Leak-protector valve" shall mean a valve provided with a leak-diverting device, which, when the valve is in any closed position, will prevent leakage of milk past the valve or, in the case of batch pasteurizers filled or emptied by suction or compressed air, will prevent leakage of milk past the valve or the leakage of milk due to the leakage of air past the suction valve or the compressed air valve, as the case may be.

(13) "Closed-coupled valve" shall mean a valve, the seat of which is either flush with the inner wall of the pasteurizer, or so closely coupled that no milk in the valve inlet is more than 1° F. colder than the milk at the center of the pasteurizer at any time during the holding period.

A close-coupled valve which is not truly flush, shall be considered as satisfying this requirement when (a) the vat outlet is so flared that the smallest diameter of the large end of the flare is not less than the diameter of the outlet line, plus the depth of the flare, and (b) the greatest distance from the valve seat to the small end of the flare is not greater than the diameter of the outlet line, and (c) in the case of batch pasteurizers, the outlet and the agitator are so placed as to insure that milk currents will be swept into the outlet.

4. *Design and Installation of Valves and Connections*

All valves and connections shall comply with the following requirements:

a. Valves and pipeline connections shall meet the requirements of item 10p.

b. All pipelines and fittings shall be so constructed and so located that leakage will not occur. Dependence shall not be placed on soldered joints to prevent leakage.

c. To prevent clogging, and to promote drainage, all leak-protection grooves shall be at least three-sixteenths inch wide, and at least three thirty-seconds inch deep at the center. Mating grooves shall provide these dimensions throughout their combined length whenever the valve is in, or approximately in, the fully closed position. All single-leak grooves, and all mating leak grooves when mated, shall extend throughout the entire depth of the seat, so as to divert leakage occurring at all points throughout the depth of the seat, and so as to prevent air bindings. Washers or other parts shall not obstruct leak-protector grooves.

d. A stop shall be provided on all plug-type outlet valves and on all plug-type inlet valves in order to guide the operator in closing the valve so that unpasteurized milk may not inadvertently be permitted to enter the outlet line or the holder, respectively. The stop shall be so designed that the plug will be irreversible when the plug is provided with any grooves or their equivalent, unless duplicate, diametrically opposite grooves are also provided. In the case of 2-way, plug-type valves (i.e. those having only one inlet and one outlet), a 180 degree stop, or any combination of stops permitting two fully closed positions, may be substituted for a 90 degree stop, provided that there are no air-relief grooves in the plug and that all leak grooves are located symmetrically with respect to the valve inlet. Stops shall be so designed that the operator cannot turn the valve beyond the stop position, either by raising the plug or by any other means.

e. Outlet valves, in addition to the requirements listed above, shall be so designed as to prevent the accumulation of unpasteurized milk in the milk passages of the valve when the valve is in any closed position.

f. All inlet pipelines and outlets from vat pasteurizers shall be equipped with leak-protector valves:

Provided, That installations not equipped with leak-protector inlet valves shall be accepted when the piping is so arranged that only one vat can be connected to the inlet line at a time, and such piping is disconnected during the holding and emptying periods.

g. Inlet and outlet connections other than through close-coupled valves shall not enter or leave the pasteurizer below the level of the milk therein.

h. In cases where the inlet line enters the holder above the milk level, and in which the inlet line may be submerged and thus prevent its complete emptying when the inlet valve is closed, the inlet line shall be provided with an automatic air-relief, or vent located either at the valve or elsewhere, and so designed as to function in every closed position of the valve. A vent may be provided by drilling a hole at least one-eighth inch in diameter in the vat pipe, below the vat cover, but above the maximum milk level.

i. All leak-protector valves shall be installed in the proper position to insure the function of the leak-diverting device. Inlet valves shall not be located in vertical pipelines, unless they can be so installed that one of the groove systems is at the lowest level of the valve; and pipelines between the inlet valve and the pasteurizer shall be as short as practicable and shall be sloped to drain:

j. All outlet valves shall be kept fully closed during filling, heating, and holding periods; and all inlet valves shall be kept fully closed during holding and emptying periods.

5. *Recording Charts*

All recording thermometer charts shall comply with all the applicable requirements of item 16p (D), page 80.

ITEM 16p(B). HIGH-TEMPERATURE, SHORT-TIME, CONTINUOUS-FLOW PASTEURIZATION

1. All indicating thermometers and recorder/controller instruments and devices used in connection with the high-temperature, short-time, continuous-flow pasteurization of milk or milk products shall comply with the applicable specifications set forth in Appendix H, page 147.

2. Each high-temperature, short-time, continuous-flow pasteurization system shall be equipped with an automatic milkflow control of the diversion type, which complies with the following definition, specifications, and performance requirements:

a. The term automatic milkflow controls shall mean those safety devices which control the flow of milk in relation to the temperature of the milk, or heating medium and/or pressure, vacuum, or other auxiliary equipment. Milkflow controls shall not be considered as part of the temperature control equipment. Milkflow controls include (1) milk pump stops; (2) milk pump stops and spring-operated valves which automatically start and stop the flow of milk at legal and sublegal pasteurization temperatures, respectively; and (3) flow-diversion devices which automatically cause the diversion of the milk in response to a sublegal pasteurization temperature. At sublegal temperatures, flow-diversion devices return the milk to the raw milk side of the heating system continuously until legal pasteurization temperatures are obtained; at which time, the device restores forward-flow through the pasteurizer.

b. All flow-diversion valves and other milkflow stops used in continuous pasteurizers shall comply with the following or equally satisfactory specifications:

(1) *Flow-Diversion Valves.*—(a) Forward flow of subtemperature milk, due to the omission or looseness of the connecting clip, shall be prevented by making the valve and its actuating mechanism integral; or, where there is a connecting device, by making it impossible to assemble the valve and its actuating mechanism, except in such manner that it will function properly; or, where there is a connecting device which may be omitted or shaken loose by providing for pushing, instead of pulling, the valve to the diverted position; or by providing that the pump will shut down when the milk is below the pasteurization temperature and the valve is not in the fully diverted position; or by any other equally satisfactory means.

(b) It shall be impossible to tighten the stem packing to such an extent as to prevent the valve from assuming the fully diverted position.

(c) A leak escape shall be installed on the forward-flow side of the valve seat. However, when back pressure is exerted on the forward-flow side of the valve seat, while the milkflow is being diverted, the leak escape should lie between two valve seats, or between two portions of the same seat, one upstream and the other downstream from the leak escape. The leak escape shall be so designed and the valve so installed as to drain all leakage to the outside.

(d) The closure of the forward-flow seat shall be sufficiently tight so that leakage past it will not exceed the capacity of the leak escape device, as evidenced when the forward-flow line is disconnected; and, in order that proper seating may not be disturbed, the length of the connecting rod shall not be adjustable by the user.

(e) The flow-diversion valve shall be so designed and installed that failure of the primary motivating power shall automatically divert the flow of milk.

(f) The flow-diversion valve shall be located downstream from the holder. The flow-control sensor shall be located in the milk line not more than 18 inches upstream from the flow-control device.

(g) The pipeline from the diversion port of the flow-diversion valve shall be self-draining, and shall be free of restrictions or valves, unless such restrictions or valves are so designed that stoppage of the diversion line cannot occur.

(2) *Milk-Flow Controller Instrumentation.*—The following requirements shall be met with respect to the instrumentation of the milk-flow controller:

(a) The thermal limit controller shall be set and sealed so that forward flow of product cannot start unless the temperature at the controller sensor is above 161° F. nor continue during descending temperatures when the temperature is below 161° F. The seal shall be applied by the health authority after test, and shall not be removed without immediately notifying the health authority. The system shall be so designed that no milk can be bypassed around the controller sensor which shall not be removed from its proper position during the pasteurization process. The cut-in and cut-out milk temperatures, as shown by the indicating thermometer, shall be determined at the beginning of each day's operation and entered upon the recorder chart daily by the plant operator.

(b) Manual switches for the control of pumps, homogenizers, or other devices which produce flow through the holder, shall be wired so that the circuit is completed only when the milk is above 161° F. or when the diversion valve is in the fully diverted position.

(3) *Holding Tube.*—(a) Holders shall be designed to provide for the holding of every particle of milk or milk product for at least 15 seconds.

(b) The holder shall be so designed that the simultaneous temperature difference between the hottest and coldest milk in any cross section of flow at any time during the holding period will not be greater than 1° F. This requirement may be assumed to have been satisfied without test in tubular holders of 7 inches or smaller diameter which are free of any fittings through which the milk may not be thoroughly swept.

(c) No device shall be permitted for short circuiting a portion of the holder to compensate for changes in rate of milkflow. Holding tubes shall be installed so that sections of pipe cannot be left out, resulting in a shortened holding time.

(d) The holding tube shall be arranged to have a continuously upward slope in the direction of flow of not less than one-fourth inch per foot.

(e) Supports for tubes shall be provided to maintain all parts of holding tubes in a fixed position, free from any lateral or vertical movement.

(f) The holder shall be so designed that no portion between the inlet and the flow-control temperature sensor is heated.

(4) *Indicating and Recording Thermometers.*—(a) An indicating thermometer shall be located as near as practicable to the temperature sensor of the recorder controller, but may be located a short distance upstream from the latter where milk between the two thermometers does not differ significantly in temperature.

(b) The temperature shown by the recorder controller shall be checked daily by the plant operator against the temperature shown by the indicating thermometer. Readings shall be recorded on the chart. The recorder controller shall be adjusted to read no higher than the indicating thermometer.

(c) The recorder controller charts shall comply with the applicable provisions of item 16p (D), page 80.

(5) *Flow-Promoting Devices.*—(a) The pump, or pumps, and other equipment which may produce flow through the holder shall be located upstream from the holder, provided that pumps and other flow-promoting devices may be located downstream from the holder if means are provided to eliminate negative pressure between the holder and the inlet to such equipment. When vacuum equipment is located downstream from the holder, an effective vacuum breaker, plus an automatic means of preventing a negative pressure in the line between the flow-diversion valve and the vacuum chamber, shall be acceptable.

(b) The speed of pumps or other flow-promoting devices governing the rate of flow through the holder shall be so controlled as to insure the holding of every particle of milk for at least 15 seconds. In all cases, the motor shall be connected to the metering pump by means of a common driveshaft, or by means of gears, pulleys, or a variable-speed drive, with the gear box, the pulley box, or the setting of the variable-speed protected in such a manner that the holding time cannot be changed without detection by the health authority. This shall be accomplished by the application of a suitable seal(s) after tests by the health authority and such seal shall not be broken without immediately notifying the health authority. The provision shall apply to all homogenizers used as timing pumps.

Variable-speed drives used in connection with the metering pump shall be so constructed that wearing or stretching of the belt results in a slowdown, rather than a speedup, of the pump.

The metering or timing pump shall be of the positive displacement type.

(c) The holding time shall be taken to mean the flow time of the fastest particle of milk, at or above 161° F., throughout the holder section; i.e., that portion of the system that is outside of the influence of the heating medium, and slopes continuously upward in the downstream direction, and is located upstream from the flow-diversion valve. Tests for holding time shall be made when all equipment and devices are operated and adjusted to provide for maximum flow. When a homogenizer is located upstream from the holder, the holding time shall be determined with the homogenizer in operation with no pressure on the homogenizer valves. Where bypass lines are provided, either upstream or downstream from the the metering pump, the holding time shall be tested with both the regular and bypass line open, unless the bypass valve is so designed that both lines cannot be open at the same time.

The holding time shall be tested during both forward and diverted flow. If necessary to lengthen the holding time during diverted flow, an identifiable restriction may be placed in the vertical portion of the diversion pipeline.

When vacuum equipment is located downstream from the holder, the holding time shall be tested with the metering pump operating at maximum flow, and the vacuum equipment adjusted to provide for the maximum vacuum.

The holding time shall be tested in both forward and diverted flow by the health authority initially, semiannually thereafter, after any alteration or replacement that may affect the holding time, and whenever the seal of the speed setting has been broken.

(6) *Prevention of Product Adulteration With Added Water.*— (a) When culinary steam is introduced directly into the milk or milk product downstream from the flow-diversion valve, means shall be provided to preclude the addition of steam to the product, unless the flow-diversion valve is in the forward-flow position. This provision may be satisfied by the use of an automatic steam control valve with temperature sensor located downstream from the steam inlet, or by the use of an automatic solenoid valve installed in the steam line and so wired through the flow-diversion valve controls that steam cannot flow unless the flow-diversion valve is in the forward-flow position.

(b) When culinary steam is introduced directly into the milk or milk product, automatic means shall be provided to maintain a proper temperature differential between incoming and outgoing milk to preclude dilution with water.

(c) Where a water feed line is connected to a vacuum condenser and the vacuum condenser is not separated from the vacuum chamber by a physical barrier, means shall be provided to preclude the backup and overflow of water from the vacuum condenser to the vacuum chamber. This provision may be satisfied by the use of a safety shutoff valve, located on the water feed line to the vaccum condenser, automatically actuated by a control which will shut off the inflowing water, if for example, the condensate pump stops and the water level rises above a predetermined point in the vacuum condenser. This valve may be actuated by water, air, or electricity, and shall be so designed that failure of the primary motivating power will automatically stop the flow of water into the vacuum condenser.

ITEM 16p (C). PASTEURIZERS EMPLOYING MILK-TO-MILK REGENERTIVE HEATING

Pasteurizers employing milk-to-milk regenerative heating with both sides closed to the atmosphere shall comply with the following or equally satisfactory specifications:

1. Regenerators shall be constructed, installed, and operated so that pasteurized milk in the regenerator will automatically be under greater pressure than raw milk in the regenerator at all times.

2. The pasteurized milk, between its outlet from the regenerator and the nearest point downstream open to the atmosphere, shall rise to a vertical elevation of 12 inches above the highest raw milk level downstream from the constant-level tank and shall be open to the atmosphere at this or a higher elevation.

3. The overflow of the top rim of the constant-level raw milk tank shall always be lower than the lowest milk level in the regenerator.

4. No pump or flow-promoting device which can affect the proper pressure relationships within the regenerator shall be located between the pasteurized milk outlet from the regenerator and the nearest downstream point open to the atmosphere.

5. No pump shall be located between the raw milk inlet to the regenerator and the raw milk supply tank, unless it is designed and installed to operate only when milk is flowing through the pasteurized milk side of the regenerator, and when the pressure of the pasteurized milk is higher than the maximum pressure produced by the pump. This may be accomplished by wiring the booster pump so that it cannot operate unless (a) the metering pump is in operation, (b) the flow-diversion valve is in forward-flow position, and (c) the pasteurized milk pressure exceeds, by at least 1 pound per square inch, the maximum pressure developed by the booster pump. Pressure gages shall be installed at the raw milk inlet to the regenerator and the pasteurized milk outlet of the regenerator or the outlet of the cooler. The accuracy of required pressure gages shall be checked by the health authority on installation, quarterly thereafter, and following repair or adjustment (see App. I, Test 9, p. 160).

6. The motor, casing, and impeller of the booster pump shall be identified, and such records thereof maintained as directed by the health authority.

7. All raw milk in the regenerator will drain freely back into the constant-level raw milk tank when the raw milk pump(s) are shut down and the raw milk outlet from the regenerator is disconnected.

8. When vacuum equipment is located downstream from the flow-diversion valve, means shall be provided to prevent the lowering of the pasteurized milk level in the regenerator during periods of diverted flow or shutdown. An effective vacuum breaker, plus an automatic means of preventing a negative pressure, shall be installed in the line between the vacuum chamber and the pasteurized milk inlet to the regenerator.

(See Appendix H, page 138 for further discussion concerning methods of achieving the required pressure relationships within the regenerator.)

ITEM 16p(D). TEMPERATURE RECORDING CHARTS EQUIPMENT TESTS AND EXAMINATIONS

1. All temperature recording charts shall be preserved for a period of 3 months. The use of such charts shall not exceed the time limit for which they are designed. Overlapping of recorded data shall be a violation of this item. The following information shall be entered on the charts as applicable:

(a) *Batch Pasteurizers:*

(1) Date.

(2) Number or location of recorder when more than one is used.

(3) Extent of holding period, including filling and emptying times when required (item 16p(A)).

(4) Reading of airspace thermometer within the holding period at a given time or reference point as indicated on the chart (item 16p(A)).

(5) Reading of indicating thermometer within the holding period at a given time or reference point as indicated on the chart (item 16p(A)).

(6) Quarterly, the initials of the health authority opposite the required readings of the indicating thermometer and airspace thermometer (item 16p(A)).

(7) Quarterly, the time accuracy of the recorder, as determined by the health authority (App. I, Test 3, p. 156).

(8) Amount and name of pasteurized milk or milk product represented by each batch or run on the chart.

(9) Record of unusual occurrences.

(10) Signature or initials of operator.

(11) Name of milk plant.

(b) *High-Temperature, Short-Time Pasteurizers.*—Recording thermometer charts shall contain all the information specified in (a) above, except (3) and (4), and in addition, shall include the following:

(1) A record of the time during which the milkflow diversion valve is in the forward flow position.

(2) The cut-in and cut-out milk temperatures recorded daily by the operator at the beginning of the run, and initialed quarterly by the health authority (item 16p(B)).

Note.—The recorded temperature shown on the controller chart shall be used to determine that the required temperature for milk products containing higher fat and/or sweeteners has been achieved.

2. ***Equipment Tests and Examinations.***—The health authority shall perform the indicated tests on the following instruments and devices initially on installation, and at least once each 3 months thereafter, and whenever any alteration or replacement is made which may affect the proper operation of the instrument or device: *Provided*, That the holding time test shall be conducted semiannually.

Instrument or device	*Appendix I* *Test No.*	*Page*	**Test objective**
Batch pasteurizer indicating thermometer	1	154	Accuracy.
Batch pasteurizer recording thermometer	2	155	Temperature accuracy.
	3	156	Time accuracy.
	4	156	Check reading of recording thermometer against indicating thermometer.
Airspace thermometer	1	154	Accuracy.
Valves	6	158	Leakage in plug type leak-protector valves and poppet type valves.
HTST indicating thermometer	1	154	Accuracy.
	7	159	Thermometric response.
HTST recording thermometer	2	155	Temperature accuracy.
	3	156	Time accuracy.
HTST recorder controller	2	155	Temperature accuracy.
	4	156	Check reading of recorder controller against indicating thermometer.
	8	159	Thermometric response.
	10	162	Confirm cut-in and cut-out temperatures.
HTST flow diversion valve	5	157	Assembly and function.
HTST auxiliary (booster) pump	9	160	Function of automatic control devices.
	9	160	Accuracy of pressure gauges.
HTST systems	11	163	Check holding time.

ITEM 17p. COOLING OF MILK

All raw milk and milk products shall be maintained at 50° F. or less until processed. All pasteurized milk and milk products, except those to be cultured, shall be cooled immediately in approved equipment to a temperature of 45° F. or less. All pasteurized milk and milk products shall be stored at a temperature of 45° F. or less and be maintained thereat until delivered. Every room or tank in which milk or milk products are stored shall be equipped with an accurate thermometer.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All raw milk and milk products are maintained at 50° F. or less until processed.

2. All pasteurized milk and milk products, except those to be cultured, are cooled immediately in approved equipment to a temperature of 45° F. or less. All pasteurized milk and milk products shall be stored at a temperature of 45° F. or less and be maintained thereat until delivered.

3. Each refrigerator room in which milk or milk products are stored is equipped with a thermometer which complies with the applicable specifications of Appendix H, page 151. Such thermometer shall be located in the warmest zone of the refrigerator room.

Each storage tank shall be equipped with a thermometer, the sensor of which shall be located to permit the registering of the temperature of the contents when the tank contains no more than 20 percent of its calibrated capacity. Such thermometer shall comply with the applicable specifications of Appendix H, page 151.

4. All surface coolers comply with the following specifications:

a. The sections of open-surface coolers shall be so installed as to leave a gap of at least one-quarter inch between the header sections to permit easy cleaning.

b. Where header ends are not completely enclosed within the cooler covers, condensation or leakage from the headers shall be prevented from entering the milk or milk products by so shaping the exposed header faces, above and below all gaps, that condensation is directed away from the tubes, and by using deflectors at the bottom of the headers, or by shortening the bottom trough, or by some other approved method.

c. The location of supports of cooler sections shall prevent drip from entering the milk or milk products.

d. All open surface coolers shall be provided with tight-fitting shields which protect the milk and milk products from contamination by flies, dust, drip, splash, or manual contact.

5. Recirculated cold water which is used in coolers and exchangers is from a safe source and protected from contamination. Such water shall be tested semiannually and shall comply with the bacteriological standards of Appendix G, page 134. Recirculated water systems which become contaminated through repair work or otherwise shall be properly treated and tested before being returned to use. Freezing point depressants, when used in recirculating systems, shall be nontoxic.

ITEM 18p. BOTTLING AND PACKAGING

Bottling and packaging of milk and milk products shall be done at the place of pasteurization in approved mechanical equipment.[j]

ADMINISTRATIVE PROCEDURES[k]

This item is deemed to be satisfied when:

1. All milk and milk products, including concentrated milk and milk products are bottled and packaged at the plant where final pasteurization is performed. Such bottling and packaging shall be done without undue delay following final pasteurization.

2. All bottling or packaging is done on approved mechanical equipment. The term "approved mechanical equipment" shall not be interpreted to exclude manually operated machinery but is interpreted to exclude methods in which the bottling and capping devices are not integral in one system.

3. Bottling or packaging machines are designed to minimize the need for adjustment during operation. All pipes, connections, defoaming devices, and similar appurtenances shall comply with items 10p and 11p.

4. Bottling or packaging machine supply tanks and bowls have covers which are constructed to prevent any contamination from reaching the inside of the filler tank or bowl. All covers shall be in place during operation.

5. A drip deflector is installed on each filler valve. Such drip deflector shall be designed and adjusted to divert condensation away from the open container.

6. Container infeed conveyors to automatic bottling or packaging machines have overhead shields to protect the bottles or packages from contamination. Such shields shall extend from the bottle washer discharge to the bottle feed star or, in the case of single service packaging machines, from the forming unit discharge to the filling unit and from the filling unit to the closure unit. Overhead shields shall be required on can infeed conveyors when the cans are fed to the filler with covers off.

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[j] Communities desiring to regulate the sale of cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should add the following: *Provided*, That cottage cheese and creamed cottage cheese may be transported in sealed containers in a protected, sanitary manner from one plant to another for creaming and/or packaging.

[k] Communities desiring to regulate the sale of cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should add the following to the Administrative Procedures of item 18p:

> "Cottage cheese and creamed cottage cheese are protected in a sanitary manner: they may be transported in sealed containers from one plant to another for creaming and/or packaging."

7. Container fabricating materials, such as paper stock, foil, wax, plastic, etc., are handled in a sanitary manner and protected against undue exposure during the package assembly operation.

8. Bottling and packaging machine floats are designed to be adjustable without removing the cover.

9. The filler pipe of all bottling and packaging machines have an apron or other approved device as close to the filler bowl as possible to prevent condensation or drip from reaching the inside of the filler bowl.

10. Filling cylinders on packaging machines are protected from contamination by the use of overhead shields. When any lubricant is applied to the filler pistons, cylinders, or other milk contact surfaces, the lubricant shall be nontoxic, sterile, and shall be sparingly applied in a sanitary manner.

ITEM 19p. CAPPING

Capping or closing of milk and milk product containers shall be done in a sanitary manner by approved mechanical capping and/or closing equipment. The cap or closure shall protect the pouring lip to at least its largest diameter.

ADMINISTRATIVE PROCEDURES[1]

This item is deemed to be satisfied when:

1. The capping or closing of milk and milk product containers is done in a sanitary manner on approved mechanical capping/closing equipment. The term "approved mechanical capping and/or closing equipment" shall not exclude manually operated machinery. Hand-capping shall be prohibited: *Provided*, That if suitable mechanical equipment for the capping or closing of specific container(s) of 3 gallons or more is not available, other methods which eliminate all possibility of contamination may be approved by the health authority.

2. All mechanical capping or closure mechanisms are designed to minimize the need for adjustment during operation.

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[1] Communities desiring to regulate the sale of cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should add the following to the indicated administrative procedures of item 19p:

1. *Provided further*, That if suitable equipment is not available for capping cottage cheese and creamed cottage cheese, other methods of capping which eliminate possible chance of contamination may be approved by the health authority.

4. Closures for cottage cheese and creamed cottage cheese containers shall extend over the top edges of the container so as to protect the product from contamination during subsequent handling.

5. *Provided*, That this requirement(s) shall not apply to cottage cheese and creamed cottage cheese container closures, when such closures are supplied in a totally enclosed package, or wrapped so as to protect the closures.

3. Bottles and packages which have been imperfectly capped or closed are emptied immediately into approved sanitary containers. Such milk or milk products shall be protected from contamination, maintained at 45° F. or less, and subsequently repasteurized or discarded.

4. All caps or closures protect the pouring lip of multiuse containers to at least the greatest diameter. Single-service containers shall be so constructed that the product and the pouring and opening areas are protected from contamination during handling, storage, and when the containers are initially opened.

5. Caps and closures are handled in a sanitary manner. The first cap from each tube, the first lap(s) from each roll of cap or cover stock, and the first sheet of parchment or cover paper shall be discarded. The subsequent use of loose caps which are left in the cappers at the end of an operating period after removal from the cap tubes shall be a violation of this item.

ITEM 20p. PERSONNEL—CLEANLINESS

Hands shall be thoroughly washed before commencing plant functions and as often as may be required to remove soil and contamination. No employee shall resume work after visiting the toilet room without thoroughly washing his hands. All persons engaged in the processing, pasteurization, handling, storage, or transportation of milk, milk products, containers, equipment, and utensils shall wear clean outer garments. The use of tobacco by any person engaged in the processing of milk or milk products is prohibited.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. Hands are thoroughly washed before commencing plant functions and as often as may be required to remove soil and contamination.

2. Each employee washes his hands following a visit to the toilet room and prior to resuming work.

3. All persons engaged in the processing, pasteurization, handling, storage, or transportation of milk, milk products, containers, equipment, and utensils wear clean outer garments.

4. Tobacco is not used by any person while engaged in the processing of milk or milk products.

ITEM 21p. VEHICLES

All vehicles used for transportation of pasteurized milk and milk products shall be constructed and operated so that the milk and milk products are maintained at 45° F. or less, and are protected from sun, from freezing, and from contamination.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. All vehicles are kept clean.
2. Material which is capable of contaminating milk or milk products is not transported with milk or milk products.
3. Vehicles have fully enclosed bodies with well-fitted solid doors.

ITEM 22p. SURROUNDINGS

Milk plant surroundings shall be kept neat, clean, and free from conditions which might attract or harbor flies, other insects and rodents, or which otherwise constitute a nuisance.

ADMINISTRATIVE PROCEDURES

This item is deemed to be satisfied when:

1. There is no accumulation of trash, garbage, or similar waste in areas adjacent to the milk plant. Waste material stored in suitable covered containers shall be considered in compliance.
2. Driveways, lanes, and areas serving milk plant vehicular traffic are graded, drained, and free from pools of standing water.
3. Outdoor areas for transport tank unloading are constructed of smooth concrete or equally impervious material, properly sloped to drain, and equipped with trapped drains of sufficient size.
4. Only pesticides approved for use by the health authority and/or registered with the U.S. Department of Agriculture shall be used for insect and rodent control.

NOTE.—A convenient inspection form for milk plants, receiving stations, and transfer stations, which summarizes the applicable sanitation requirements, is found in Appendix L, page 168.

SECTION 8. ANIMAL HEALTH

All milk for pasteurization shall be from herds which are located in a Modified Accredited Tuberculosis Area as determined by the U.S. Department of Agriculture: Provided, *That herds located in an area that fails to maintain such accredited status shall have been* *accredited by said Department as tuberculosis free, or shall have passed an annual tuberculosis test.*

All milk for pasteurization shall be from herds under a brucellosis eradication program which meets one of the following conditions:

1. Located in a Certified Brucellosis-Free Area as defined by the U.S. Department of Agriculture and enrolled in the testing program for such areas; or

2. Located in a Modified Certified Brucellosis Area as defined by the U.S. Department of Agriculture and enrolled in the testing program for such areas; or

3. Meet U.S. Department of Agriculture requirements for an individually certified herd; or

4. Participating in a milk ring testing program which is conducted on a continuing basis at intervals of not less than every 3 months or more than every 6 months, with individual blood tests on all animals in herds showing suspicious reactions to the milk ring test; or

5. Have an individual blood agglutination test annually with an allowable maximum grace period not exceeding 2 months.

For diseases other than brucellosis and tuberculosis, the health authority shall require such physical, chemical, or bacteriological tests as he deems necessary. The diagnosis of other diseases in dairy cattle shall be based upon the findings of a licensed veterinarian or a veterinarian in the employ of an official agency. Any diseased animal disclosed by such test(s) shall be disposed of as the health authority directs.

ADMINISTRATIVE PROCEDURES

Tuberculosis.—All tuberculin tests and retests shall be made, and any reactors disposed of, in accordance with the *Uniform Methods and Rules* for establishing and maintaining of Tuberculosis-Free Accredited Herds of Cattle and Modified Accredited Areas, as approved by the USDA at the time of the adoption of this *Ordinance*. For tuberculosis test purposes, the herd is defined as all adult cattle 24 months of age and over, including any commingled beef animals. Dairy cattle less than 2 years of age and already milking, shall be included in the herd test. A letter or other official correspondence attesting to the accreditation status of the locality in which the herd is located, including the date of accreditation, or a certificate identifying the animals tested, the date of injection, the date of reading of the test, and the results of the test signed by a U.S. Department of Agriculture accredited veterinarian, shall be evidence of compliance with the above requirements and shall be filed with the health authority (see App. A, p. 94).

Brucellosis.—All brucellosis tests, retests, disposal of reactors, vaccination of calves, and certification of herds and areas shall be in accordance with the recommended *Uniform Methods and Rules* for brucellosis eradication. All reactors disclosed on blood agglutination tests shall be separated immediately from the milking herd; the milk of these reactors shall not be used for human consumption.

A certificate identifying each animal, signed by the veterinarian and the director of the laboratory making the test, shall be filed as directed by the health authority: *Provided*, That in the event the herd is subject to the milk ring test, the record shall be required to show only the date and results of such test. Within 30 days following the expiration of an official milk ring testing program or, in the case of a herd subject to annual blood tests, 13 months following the last annual blood test, the health authority shall notify the herd owner or operator of the necessity to comply with the brucellosis requirements. The failure of the herd owner or operator to comply with the brucellosis requirements within 30 days of written notice shall result in immediate suspension of the permit (see App. A, p. 94).

SECTION 9. MILK AND MILK PRODUCTS WHICH MAY BE SOLD

From and after 12 months from the date on which this Ordinance *is adopted, only Grade A pasteurized milk and milk products*[m] *shall be sold to the final consumer, or to restaurants, soda fountains, grocery stores, or similar establishments:* Provided, *That in an emergency, the sale of pasteurized milk and milk products which have not been graded, or the grade of which is unknown, may be authorized by the health authority; in which case, such milk and milk products shall be labeled "ungraded."*

SECTION 10. TRANSFERRING; DELIVERY CONTAINERS; COOLING

Except as permitted in this section, no milk producer or distributor shall transfer milk or milk products from one container or tank truck to another on the street, in any vehicle, store, or in any place except a milk plant, receiving station, transfer station, or milkhouse especially used for that purpose. The dipping or ladling of milk or fluid milk products is prohibited.

It shall be unlawful to sell or serve any milk or fluid milk product except in the individual, original container received from the dis-

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[m] Communities wishing to provide for the sale of certified pasteurized milk should include such product in this section.

Note.—Certified pasteurized milk is derived from certified raw milk which meets the latest requirements of the American Association of Medical Milk Commissions, Inc., 405 Lexington Ave., New York, N.Y., 10017.

tributor, or from an approved bulk dispenser: Provided, *That this requirement shall not apply to milk for mixed drinks requiring less than one-half pint of milk, or to cream, whipped cream, or half-and-half which is consumed on the premises and which may be served from the original container of not more than one-half gallon capacity, or from a bulk dispenser approved for such service by the health authority.*

It shall be unlawful to sell or serve any pasteurized milk or milk product which has not been maintained at a temperature of 45° F. or less. If containers of pasteurized milk or milk products are stored in ice, the storage container shall be properly drained.

ADMINISTRATIVE PROCEDURES

Transferring.—The dipping or ladling of milk and fluid milk products is expressly prohibited, except for immediate cooking purposes. Milk and milk product containers which have been filled and sealed at a milk plant shall be used for the delivery of milk or milk products. Caps, closures, or labels shall not be removed or replaced during transportation.

Bulk Dispensers.—Bulk dispensers, approved by the health authority, shall satisfy the following sanitary design, construction, and operation requirements:

1. All dispensers shall comply with the applicable requirements of Section 7 of this *Ordinance*.

2. Product-contact surfaces shall be inaccessible to manual contact, droplet infection, dust, or flies; but the delivery orifice may be exempted from this requirement.

3. All parts of the dispensing device with which milk or milk products come into contact, including any measuring device, shall be thoroughly cleaned and sanitized at the milk plant: *Provided*, That dispensing valves which are applied to the dispenser subsequent to its delivery to the retail vendor may be cleaned and sanitized at such establishments.

4. The dispensing container shall be filled at the milk plant and shall be so sealed that it is impossible to withdraw any part of its contents, or to introduce any substance without breaking the seal(s).

5. The milk or milk products shall be thoroughly and automatically mixed with each dispensing operation, except for milk or milk products which remain homogeneous.

6. All cans shall be thoroughly cleaned and sanitized. Milk and milk products shall be kept at or below 45° F. at all times. The dispenser tube shall be integral with the dispensing container, shall be

protected, and shall be under adequate refrigeration during transportation and storage.

SECTION 11. MILK AND MILK PRODUCTS FROM POINTS BEYOND THE LIMITS OF ROUTINE INSPECTION

Milk and milk products from points beyond the limits of routine inspection of the ____________ of ____________,[1] *or its police jurisdiction, may be sold in ____________,*[1] *or its police jurisdiction, provided they are produced and pasteurized under regulations which are substantially equivalent to this* Ordinance *and have been awarded an acceptable milk sanitation compliance and enforcement rating made by a State milk sanitation rating officer certified by the U.S. Public Health Service.*

ADMINISTRATIVE PROCEDURES

The health authority should accept, without his actual physical inspection, supplies of milk and milk products from an area or an individual shipper not under his routine inspection: *Provided*, That (1) upon arrival, each shipment of raw milk for pasteurization shall comply with the bacteriological, chemical, and temperature standards of Section 7; (2) after receipt, pasteurized milk and milk products shall comply with the bacteriological, chemical, and temperature requirements of Section 7 as determined in accordance with Section 6; (3) the milk or milk products are produced and processed under regulations substantially equivalent to those of this *Ordinance;* (4) the supplies are under routine official supervision; (5) the supplies have been awarded, by the State milk sanitation rating officer certified by the U.S. Public Health Service, a milk sanitation compliance and enforcement rating equal to that of the local supply or equal to 90 percent or higher; and (6) all ratings are made on the basis of procedures outlined in methods of making sanitation ratings of milksheds recommended by the Public Health Service.

Note.—Names of Interstate milk shippers and their ratings, as reported by State milk control authorities, are contained in *Sanitation Compliance and Enforcement Ratings of Interstate Milk Shippers*, issued quarterly by the Public Health Service for the information of interested persons. Copies of this list may be obtained from the State milk control authority or from the Public Health Service, Washington, D.C., 20201.

SECTION 12. FUTURE DAIRY FARMS AND MILK PLANTS

Properly prepared plans for all milk houses, milking barns, stables and parlors, transfer stations, receiving stations, and milk plants reg-

ulated under this Ordinance *which are hereafter constructed, reconstructed, or extensively altered, shall be submitted to the health authority for written approval before work is begun.*

SECTION 13. PERSONNEL HEALTH

No person affected with any disease in a communicable form, or while a carrier of such disease, shall work at any dairy farm or milk plant in any capacity which brings him into contact with the production, handling, storage, or transportation of milk, milk products, containers, equipment, and utensils; and no dairy farm or milk plant operator shall employ in any such capacity any such person, or any person suspected of having any disease in a communicable form, or of being a carrier of such disease. Any producer or distributor of milk or milk products, upon whose dairy farm, or in whose milk plant any communicable disease occurs, or who suspects that any employee has contracted any disease in a communicable form, or has become a carrier of such disease, shall notify the health authority immediately.

SECTION 14. PROCEDURE WHEN INFECTION IS SUSPECTED

When reasonable cause exists to suspect the possibility of transmission of infection from any person concerned with the handling of milk and/or milk products, the health authority is authorized to require any or all of the following measures: (1) the immediate exclusion of that person from milk handling; (2) the immediate exclusion of the milk supply concerned from distribution and use; and (3) adequate medical and bacteriological examination of the person, of his associates, and of his and their body discharges.

SECTION 15. ENFORCEMENT

This Ordinance *shall be enforced by the health authority in accordance with the* Grade A Pasteurized Milk Ordinance with Administrative Procedures—1965 Recommendations of the United States Public Health Service, *a certified copy*[5] *of which shall be on file at the municipal clerk's office.*[1] *Where the mandatory compliance with provisions of the appendixes is specified, such provisions shall be deemed a requirement of the* Ordinance.

SECTION 16. PENALTY

Any person who shall violate any of the provisions of this Ordinance *shall be guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not more than $________, and/or such persons* *may be enjoined from continuing such violations. Each day upon which such a violation occurs shall constitute a separate violation.*

SECTION 17. REPEAL AND DATE OF EFFECT

All ordinances and parts of ordinances in conflict with this Ordinance *shall be repealed 12 months after the adoption of this* Ordinance, *at which time this* Ordinance *shall be in full force and effect, as provided by law.*

SECTION 18. UNCONSTITUTIONALITY CLAUSE

Should any section, paragraph, sentence, clause, or phrase, of this Ordinance *be declared unconstitutional or invalid for any reason, the remainder of this* Ordinance *shall not be affected thereby.*

FOOTNOTES

In the interest of clarity and to provide easy access to their information, all numbered footnotes have been removed from the body of this publication and are assembled in this section. A numerical reference in the text will always relate to its like-numbered footnote in this section.

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[1] Substitute proper legal jurisdiction here and in all similar places throughout the *Ordinance*.

[2] Optional ingredients as defined in Section 1, Definition Q, may be used in this product.

[3] Where State law does not permit the sale of reconstituted or recombined milk and/or milk products, Definition D and other corresponding references should be omitted.

[4] Communities desiring to regulate cottage cheese and creamed cottage cheese under the terms of this *Ordinance* should insert the following definitions:

—— *Cottage Cheese:* Cottage cheese is the soft uncured cheese obtained by adding lactic-acid-producing bacteria, with or without enzymatic action, to pasteurized skim milk, pasteurized lowfat milk, or pasteurized reconstituted skim milk.[3] It shall contain not more than 80 percent moisture. Cottage cheese may be seasoned with salt.[2]

—— *Creamed Cottage Cheese:* Creamed cottage cheese is prepared by mixing cottage cheese with a pasteurized creaming mixture consisting of pasteurized cream and milk, dry milk products, concentrated skim milk, skim milk, or lowfat milk, to which salt, lactic acid, and flavor producing bacteria, rennet, lactic acid, citric acid, phosphoric acid or stabilizer may be added. The quantity of milkfat added in the creaming mixture shall be not less than 4 percent by weight of the finished creamed cottage cheese. Dry milk products or concentrated skim milk may be added, provided the amount of added solids does not exceed 3 percent of the weight of the creaming mixture. Creamed cottage cheese shall contain not more than 80 percent moisture.[3]

[5] A certified copy may be secured from the Department of Health, Education, and Welfare, Public Health Service, Washington, D.C.

APPENDIXES TO THE GRADE A PASTEURIZED MILK ORDINANCE—1965 RECOMMENDATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE

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APPENDIX A. ANIMAL DISEASE CONTROL

Copies of the "Uniform Methods and Rules" for establishing and maintaining "Tuberculosis-Free Accredited Herds of Cattle and Modified Accredited Areas" and recommended "Uniform Methods and Rules" for brucellosis eradication current at the time of adoption of this *Pasteurized Milk Ordnance* may be obtained from:

Animal Disease Eradication Division,
Agricultural Research Service,
U.S. Department of Agriculture,
Federal Center Building,
Hyattsville, Md., 20781;
or
Federal Veterinarian in Charge,
ADE, ARS, USDA,
Your State Capitol;
or
State Official in Charge of Animal Disease Control,
Your State Capitol.

It is recommended that health authorities initiate and/or promote a mastitis control program. A well-planned and extended educational phase will encourage the support of producers and reduce the problems of enforcement.

The National Mastitis Council, Inc., 118 West First Street, Hinsdale, Ill., 60521, has studied a large number of existing control programs and has outlined a suggested flexible control program. In addition, review of the current knowledge of mastitis may be found in their publication, *Current Concepts of Bovine Mastitis.*

Sanitarians may find the screening test a useful device for detecting abnormal milk. Among those which have been found effective are:

1. Direct microscopic leucocyte count.
2. California Mastitis Test.
3. Modified Whiteside Test.
4. Catalase Test.
5. Milk Quality Test.
6. Wisconsin Mastitis Test.

Regulatory action should not be based on the use of mastitis screening tests alone; screening tests should be used as an adjunct to a complete program of mastitis control and milking-time inspections.

APPENDIX B. MILK PRODUCTION, HAULING, INDUSTRY INSPECTION

I. Dairy—Construction and Operation

MILKING BARN, STABLE, OR PARLOR

Numerous factors, including the size and topography of the farm, the availability of utilities, the condition and disposition of existing buildings, the dairyman's ultimate goals for his enterprise, and his construction budget serve to make each milk producer's herd housing problems individual and unique.

While there has been a tendency for workers to develop strong convictions about the practicability of given housing or milking systems, there is little doubt that the success or failure of most dairy farm operations may be traced to good or poor planning. When the unique problems of each system in its individual application are given proper cosideration, the job of producing clean milk is made easier and compliance with regulations is simplified. For example, operators of barns in which cows are housed and milked will find that efficient ventilation not only reduces condensation, but also relieves the problem of dust and mold on walls, ceilings, and windows. When window sills are sloped or windows set flush with interior walls in stanchion barns the accumulation of dust and unwanted miscellaneous items is similarly lessened. Covered recessed light fixtures remain clean longer and are less subject to damage than those projecting from the ceiling.

Operators of milking parlor loose-housing systems, on the other hand, will value design features such as mechanically operated doors, which speed up animal traffic, and glazed wall finishes, which cut down the time required for proper post-milking wash up of the parlor. Cleaner cows result from proper planning and management of exercise yards and bedded areas. One hundred square feet of surfaced yard and not less than 50 square feet of bedded space are recommended for each animal to be accommodated. Provisions must also be made for the removal at least daily of manure from exercise yards and traffic lanes. Operators utilizing loose-housing have shown considerable interest recently in free-stall housing. Many workers have concluded that it provides the solution to the problems of unclean cows and excessive bedding demands which have plagued loose-housing in past years. Its features should be carefully studied by milk producers planning new construction or large-scale changes in existing housing.

Adequate light must be available in all work areas in the milking barn, stable, or parlor. Because many dairy functions are frequently performed after dark, it is important that the required minimum of 10 foot-candles of illumination be available from artificial sources. While absolute certainty of compliance with this requirement can only be confirmed by the use of a light meter, experience has shown that milking barns which otherwise meet the standards of this *Ordinance* will be properly lighted when equipped with one 100-watt bulb (or its fluorescent equal) for each three stanchions or per 10 linear feet of walkway behind each row of cows in face-in barns or between rows of cows in face-out barns. In addition, a smaller number of bulbs, equally spaced, is recommended for feed alleys in front of cows. When natural light is utilized, a minimum of 4 square feet of window space for each 60 square feet of floor space is recommended.

Construction plans and suggestions for the various systems of animal management are available to the sanitarian and the dairyman from numerous sources, including the USDA, the county extension agent, farm periodicals, and the trade associations serving the building supply industry.

MILKHOUSE OR MILKROOM

Milkhouses should be large enough to provide adequate space to meet present needs and should take into account the prospect of future expansion. Installed milkroom equipment should be readily accessible to the operator. Aisles should be at least 30 inches wide, with added allowance at the outlets of bulk cooling/holding tanks, adjacent to wash and rinse vats and where operational conditions warrant. It is especially important that the space available to bulk cooling/holding tanks and CIP systems be adequate to permit their disassembly, inspection and servicing.

Floor drains should not be located under bulk cooling/holding tanks unless there is sufficient room for servicing. Floor drains should not be located directly under the outlet of a bulk cooling/holding tank. Drains and waste disposal systems should be adequate to drain the volume of water used in rinsing and cleaning.

Milkrooms should be well ventilated. Proper ventilation not only avoids the obvious disadvantages of condensation on equipment and walls; it also lengthens the useful life of the building and its equipment. The constant need for renewal of painted surfaces, the repair of wooden fixtures and frames, and the removal of algae and mold from walls and ceilings of poorly ventilated milkrooms can represent a continuing expense to the operator.

Where possible, windows should be placed to provide cross ventilation. In addition, one or more ceiling vents should be located to receive water vapor rising from wash-and-rinse vats and other sources of evaporative moisture.

Glass brick is sometimes substituted for windows in milkroom construction. In these instances, mechanical ventilation must be provided. A system affording filtered positive air pressure is recommended over exhaust ventilation, as the latter frequently draws dust, insects, and odors into the milkroom.

The great demand for water under pressure in milkroom operations has emphasized the importance of protecting plumbing from freezing. Devices which have proved effective include, the insulation of water lines, the use of wrap-around heat tape, infrared lamps, and thermostatically controlled space heaters.

Insulated milkrooms make protection against freezing easier and more economical, and offer the additional advantage of greater comfort for the operator. The factor of personal convenience frequently results in better performance by the operator, with consequent benefits to milk quality.

Automated milking and CIP cleaning of milking equipment has increased the use of hot water in the milkroom. The following table will indicate the volumes of water required to fill 100 feet of pipeline of varying diameters:

Pipe diameter	Gallons
Inches	
1	4.7
1½	9.2
2	16.3

Since most CIP installations employ a prerinse, followed by wash-and-rinse cycles, this figure actually represents only one-third the usual milking-time demand for heated water. Also, it does not include the "take up" of collecting jars, pumps, rubber parts, etc.

Udder washing, bulk cooling/holding tank cleaning, and similar milkroom tasks offer additional uses for hot water.

Sanitarians should compute the hot water demand of the individual milking systems under their supervision and require that not less than the minimum amount be available at all times. Milk producers should be made aware of the fact that effective cleaning of CIP installations is impossible without adequate hot water and should be encouraged to provide a supply which exceeds their expected need. Such planning avoids emergency shortages and allows for normal expansion of the herd and facilities.

Detailed plans for milkhouses, as well as recommendations on hot water needs, insulation, lighting, and ventilation are available from power companies, building supply associations, county extension agents, and State universities.

Refrigeration, electrical or mechanical systems powered by gasoline or diesel engines have no place in a milkroom, milking barn, or in any communicating passageway between the milkroom and milking barn. Such equipment is characteristically given to oil leakage and the discharge of fumes. The spaces occupied by it are difficult to keep clean and frequently become gathering places for trash and flammable materials. With effective planning, these engines and their accessory equipment can be located, without detriment to their performance, in a separate room or building adjacent to the barn or milkhouse.

MILKING METHODS

Milking methods must be geared to permit the efficient withdrawal of milk without introducing undue numbers of bacteria or causing injury to the udder.

In addition to assessing the Nation's milk producers a cost which has been estimated to approach $500 million annually, mastitis has been found to pose serious public health hazards. The most widespread of these is a gastrointestinal disorder caused by toxins produced by certain strains of staphylococci.

It has been known for many years that a relationship exists between mastitis and milking practices. While not all the facts are known about mastitis, it is abundantly clear that its control is enhanced by use of mechanically sound milking equipment and good milking practices. The National Mastitis Council has described a satisfactory milking system as one which (1) maintains a stable vacuum in the teat cup and at a level adequate for completely milking most udders in 3 to 5 minutes, (2) does not stress the tissues of the teat by excessive stretching and ballooning, (3) produces massage without harsh action, and (4) is designed so that the entire system can be sanitized efficiently and satisfactorily.

The Council considers proper milking procedure to include the following: (1) before the milking unit is applied to the udder the operator takes 30 seconds to prepare the cow in the recommended manner to obtain milk letdown, and the milking machine should be applied immediately thereafter, (2) the teat cups are attached in a manner to limit the volume of air drawn into the system, (3) the teat cups are positioned as low on the teats as practicable, (4) the operator stays near the machine and, at the end point of milk removal, the claw is briefly pulled down to open the teat cavity and remove the strippings. Stripping by machine should not extend over a period of more than 15 to 20 seconds. Prolonging stripping can be injurious to the udder, (5) before removing the machine, the vacuum to the teat cups is broken and the cups removed in a gentle manner, (6) to avoid over-milking, the operator should limit the number of machines in use. Two bucket type units, two movable pipeline units, or three fixed units, in a walk-through barn usually represent maximum workloads with conventional milking systems.

Hooded, or small-mouthed pails may be used for carrying only that milk which has been drawn into them by hand-milking. Their extended use as carrying pails is considered hazardous in view of their inability to be covered or otherwise protected from flies, dust, splash, etc.

INSECT AND RODENT CONTROL

The complete elimination of flies from the farm premises is practically unattainable. However, a major reduction of fly infestation is obtainable by the dairy farm operator who conscientiously follows a sustained program of sanitation, screening, and the proper use of insecticides.

The milk producer or plant operator must be continually aware of the potential hazard to men and animals which is inherent in most pesticides. It is important that he employ only those pesticides which are recommended by competent authority for the insect and rodent problems he seeks to overcome, and that he follow implicitly the manufacturer's directions for their use. Questions on the use of pesticides should be referred to the supervising health authority and/or county agricultural agent. U.S. Department of Agriculture Publication Nos. 270 and 283, and Agriculture Handbook No. 120 of the Agricultural Research Service and Federal Extension Service, also provide additional information on this subject.

Effective rodent control, like insect control, is dependent on sanitation for much of its success. The careful elimination of trash and woodpiles; the rodent proofing of feed bins, corn cribs, and similar structures; the prompt removal of spilled feed and manure to places of ultimate disposition; and the deliberate elimination of protected harborage areas in farm buildings, all tend to discourage rodents near the dairy farm. Such a program also pays excellent dividends in feed savings, lowered maintenance costs for farm buildings, reduced fire hazards, and lessened risk of disease outbreaks among farm animals.

In recent years, anticoagulant poisons (Warfarin—Fumarin, etc.) have offered improved means of controlling rodents on the farm. Used according to directions—and with due precaution against their consumption by domestic animals—these chemicals help keep the rodent population in check while additional preventive programs are instituted.

The Communicable Disease Center, Public Health Service, Department of Health, Education, and Welfare, Atlanta, Ga., annual publication, *Public Health Pesticides*, provides an excellent resume of practices recommended for the control of insects and rodents.

II. Farm Bulk Milk Hauling

The unique position occupied by the farm bulk milk hauler makes him a critical factor in the current structure of milk marketing. As a weigher and sampler, he stands as the official—and frequently the only—judge of milk volumes bought and sold. As a milk receiver, his operating habits directly affect the quality of milk committed to his care. When his obligations include the collection and delivery of samples for laboratory analysis, he becomes a vital part of the quality control and regulatory programs affecting his producer patrons.

In implementing Section 3 of the *Pasteurized Milk Ordnance*, it is recommended that the health authority consider the establishment of criteria for the issuing of permits to farm bulk milk haulers. These criteria should embrace at least the following:

TRAINING

Training frequently takes the form of classroom sessions in which the sanitarian describes pickup practices, demonstrates sampling and care of samples and affords the candidate the opportunity for guided practice in these techniques. Basic considerations of sanitation and personal cleanliness, which are important to the protection of milk quality, are discussed here. Officials administering weights and measures frequently participate in these programs and provide instruction in weighing of milk and the keeping of required records. An examination is usually administered at the conclusion of this program; candidates failing the test are denied permits until indicated deficiencies are corrected.

Regularly scheduled refresher short courses for farm bulk haulers by sanitarians and officials administering weights and measures would assist in maintaining and increasing the efficiency of the hauler.

QUALIFICATIONS

1. **Experience.**—Experience which may include a required period of observation apprenticeship in which the candidate accompanies a permittee in the performance of his duties.

2. **Personal References.**—Permit applications should be supported by suitable references testifying to the character and integrity of the candidate.

EVALUATION OF HAULER AND OPERATIONS

The periodic evaluation of hauling operations provides the health authority with an opportunity to check both the condition of the hauler's equipment and the degree to which he is observing required pickup practices.

The hauler's pickup technique is best checked when the sanitarian is able to accompany him on his route for at least a full day's run. When this is impossible, the sanitarian may arrange to intercept him at one or more farms.

The sanitarian's inspection will provide useful information on the overall attitude of the farm bulk milk hauler to his work. He should see the inherent danger in any evidence of carelessness on the job and should seek its correction. Frequent visits by the sanitarian are recommended in such instances.

Specific items to be evaluated in judging hauler performance should include:

1. Personal Appearance.—Haulers should be neat appearing, wear clean outer garments, and have clean hands.

2. Care of Equipment.—Milk hose, dippers, outlet valves, etc., should be protected from contamination. Dippers should be sanitized before use. Sampling tubes and similar devices, when delivered in a sterile condition, must be so maintained until used. Milk hoses should remain capped except when connected to bulk cooling/holding tanks and should be rinsed free of exterior soil as often as needed. Bulk cooling/holding tank outlets should be free of accumulations of milk when the delivery hose is attached. The routine cleaning and sanitizing of the bulk tank outlet is the responsibility of the producer; however, when necessary, the hauler should clean and sanitize the bulk tank outlet prior to attaching the delivery hose.

3. Protection of Milk.—Tank lids should be kept closed. Ports should be used for sampling and measuring, and for checking the odor and appearance of the milk.

Delivery hose should be disconnected and capped before rinsing the bulk cooling/holding tank. The manhole cover of the bulk transport tank should not be opened during pickup or transport of milk to the milk plant, receiving station, or transfer station.

4. Protection of Samples.—The procedures for sampling and the care of samples, shall be in substantial compliance with *Standard Methods for the Examination of Dairy Products*, of the American Public Health Association. Samples and sample containers must not be contaminated by improper handling during or after sampling. Samples must be properly identified and refrigerated as soon as drawn.

III. Certification of Industry Dairy Farm Inspectors

PURPOSE OF CERTIFICATION

The purpose of certification is to have the applicant formally demonstrate his ability to apply proper interpretations of the *Pasteurized Milk Ordinance* when inspecting dairy farms.

DESIGNATION OF INDIVIDUALS TO BE CERTIFIED

Candidates shall submit requests for certification to the health authority. The applicant for certification shall have had appropriate experience in the field of milk sanitation, and shall be a full-time employee of a milk plant, a producer association or officially designated laboratory, or shall be employed on a consulting basis in dairy field work by such establishments.

RECORDING OF QUALIFICATION DATA

Prior to conducting the certification procedure, background information shall be secured on the applicant. This shall include academic training, experience in milk sanitation, and related fields, in-service courses attended, etc. This information is to be retained by the health authority as part of the applicant's file, along with appropriate records of his performance during certification examinations.

FIELD PROCEDURE

Only one applicant shall be certified at a time. The certification is to be conducted without prompting from the health authority or comparison of inspection results in any way until the entire procedure is completed. Certification shall not be made during the course of an official inspection by the health authority.

At least 25 randomly selected dairy farms shall be visited. After the necessary inspections have been completed, the health authority shall compare his results with those of the candidate. The percentage agreement for each item of sanitation shall be determined by dividing the number of agreements by the total number of dairy farms that were inspected.

CRITERIA FOR CERTIFICATION

In order to be certified, an industry inspector shall agree with the health authority 80 percent of the time on individual items of sanitation, and shall further agree to comply with the administrative procedures established by the health authority for the program of dairy farm supervision. The health authority should allow sufficient time to discuss his findings with the applicant.

DURATION OF CERTIFICATION

Certification of industry inspection personnel shall be for a period not exceeding 1 year from the date of formal certification or recertification unless revoked.

RECERTIFICATION

The health authority shall notify the certified industry inspector of the need for renewal of his certification at least 60 days prior to its expiration; if recertification is desired, he will make appropriate arrangements for the renewal procedure. Recertification can be made for the succeeding 1-year period, by following the procedures outlined above.

REPORTS AND RECORDS

Upon satisfactory completion of certification or recertification, the certified industry inspector shall be issued a certificate. The milk plant(s) or officially designated laboratory(ies) employing the inspector shall be formally notified by letter of the certification; the letter shall outline the purpose of the certification and the conditions under which the certification may be retained. A copy of the notification letter, together with a copy of the qualification data above, and a resume of the percentage agreement on individual items shall be retained by the health authority.

REVOCATION OF CERTIFICATION

The certification of an industry inspector may be revoked by the health authority upon a finding that he is: (1) not in agreement with the health authority at least 80 percent of the time on items of sanitation in a field examination conducted as described in the *Field Procedure* outlined above; (2) not complying with the established administrative procedures of the health authority for the program; or (3) failing to carry out the provisions of the *Pasteurized Milk Ordinance* in the course of his work.

APPENDIX C. CONSTRUCTION STANDARDS FOR TOILET AND SEWAGE DISPOSAL FACILITIES

FLUSH TOILETS

Flush toilets are preferable to pit privys, earth closets, or chemical toilets at both dairy farms and milk plants. Their installation shall conform to the local or State plumbing regulations, or in the absence of these, to the standards contained in the *Report of Public Health Service Technical Committee on Plumbing Standards*, September 1962, PHS Publication No. 1038. Toilets shall be located in a well-lighted and well-ventilated room. Fixtures shall be protected against freezing. The following shall be considered defects in flush-toilet installations: (1) Insufficient water pressure or volume; (2) leaky plumbing; (3) clogged sewers, as evidenced by overflowing toilet bowl; (4) broken tile lines or clogged disposal field; (5) access of dairy cows to the effluent below the sewer or disposal-field discharge; (6) effluent coming to the surface of the ground in the absorption field; (7) toilet room floor soaked with urine or other discharges; (8) offensive odors, or other evidence of lack of cleanliness; (9) location of soil lines, septic tank, absorption field, or leaching pit closer to the source of water supply than the limits indicated in Appendix D, page 107.

SEPTIC TANKS

Disposal of the wastes from toilets should preferably be into a sanitary-sewer system. Where such systems are not available to a dairy farm or milk plant, the minimum satisfactory method should include treatment in a septic tank, with the effluent discharged into the soil. Where soil of satisfactory permeability is not available, the effluent shall be disposed of in accordance with the rules of the State health authority. It is preferable to treat floor drainage, wastes from washing of utensils, etc., in separate systems. When such wastes are combined with toilet wastes in the septic tank system, careful consideration must be given to the expected flow in the design of both the septic tank and the leaching system.

The septic tank shall be located a safe distance from water sources as determined by consideration of the criteria indicated in Appendix D, page 107; and the health authority shall review and approve proposed installations prior to the initiation of construction. The location should permit easy access for inspection and cleaning. The site should be chosen to make the largest possible area available for the disposal field.

The size of the septic tank should be based on the average daily flow of sewage, a retention period of approximately 24 hours, and adequate sludge storage. The minimum liquid capacity of a septic tank should be 750 gallons. The outlet should be baffled to prevent floating scum from passing out with the overflow. The septic tank cover or slab should be watertight and designed to be insect and rodent proof and to withstand any load likely to be placed upon it. Each tank should have a manhole for each compartment when it is provided with a solid-slab cover. The manhole covering should be made watertight.

Septic tanks should be constructed of materials which are not subject to excessive corrosion or deterioration.

DISPOSAL FIELDS FOR SEPTIC TANKS

A distribution box is considered desirable in every field system. The design of the field should be based on the expected sewage flow, the actual absorptive quality of the soil, and the total bottom area of the trenches. Tile or perforated pipe designed for this use, of not less than 4-inch diameter, is recommended for field laterals. Laterals should be separated by at least three times the width of the trenches, with a minimum of 6 feet.

Trenches should be filled with broken stone or screened gravel, from a depth at least 6 inches below the distributing pipes, to a level at least 2 inches above the top of the lines. When drain tile is used, joints should be open about one-quarter inch, and the openings protected by tarpaper strips over the top and sides. The aggregate should be protected from loose backfill by means of a separating strip of untreated building paper or similar material. Under no condition should a field with less than 150 square feet of effective absorption area (100 linear feet of 18-inch trench) be provided for any individual unit. Maximum length of individual lines should not exceed 100 feet. The slope of the field's lateral lines may vary from 2 inches to 4 inches per 100 feet, but should never exceed 6 inches per 100 feet. It is desirable to have the tile lines within 18 inches of the finished grade; however, the total depth of the lateral trenches should never average more than 36 inches.

In some instances seepage pits may provide a more satisfactory means of disposal of effluent. Walls should be permeable, and the liquid capacity should be not less than that of the septic tank. Total wall area should be proportionate to absorptive quality of the soil and to expected sewage flow.

Information as to methods of making percolation tests to determine absorptive quality of the soil may be obtained from State and local health departments. From the same sources, advice may be obtained as to trench areas needed for various numbers of users, in relation to observed percolation rates. In view of their close knowledge of local conditions, it is recommended that such assistance be requested before an absorption system is constructed.

NOTE.—Public Health Service Publication No. 526, *Manual of Septic Tank Practice*, is an excellent source of detailed information on this subject.

EARTH-PIT PRIVY

The earth-pit privy offers the most suitable type of excreta disposal unit for the dairy farm where water carriage systems of disposal cannot be provided. While there are many different designs in use, the basic elements are the same in all cases. The following standards are from the recommendations of the Joint Committee on Rural Sanitation, entitled *Individual Sewage Disposal Systems*, Reprint No. 2461 (reprinted 1950) from Public Health Reports.

General.—The earth pit should be of such capacity that it may be used for several years without requiring the privy to be moved. Excreta and toilet paper are deposited directly into the pit. Aerobic bacteria break down the complex organic material into more or less inert material. Insects, animals, and surface water must be prevented from entering the pit. It is essential that the privy be designed and constructed so that the pit can be kept flytight.

Location.—The location of the privy shall take into account the need to prevent the contamination of water supplies. The criteria of Appendix D, page 107, shall be applied. On sloping ground, it shall be located at a lower elevation than the water supply. On level ground, the area around both privy and water supply should be mounded with earth. If the installation of an earth-pit privy will endanger the safety of the water supply, other methods of disposal must be used.

The site should be accessible to all potential users. Consideration should be given to the direction of prevailing winds to reduce fly and odor nuisances. The privy pit should not encroach within 6 feet of any building line or fence, in order to allow proper construction and maintenance.

Pit, Sill, and Mound.—A minimum pit capacity of 50 cubic feet is recommended. The pit should be tightly sheathed for several feet below the earth surface, but openings in the sheathing are desirable below this depth. The sheathing should extend from 1 to 2 inches above the natural ground surface, to provide space between the sill and the upper portion of the sheathing, so that the floor and building will not rest on the sheathing. A reinforced concrete sill should be provided for support of the floor and superstructure. The sill should be placed on firm, undisturbed earth.

An earth mound, at least equal in thickness to the concrete sill, should be constructed with a level area 18 inches away from the sill in all directions.

Floor and Riser.—Impervious materials, such as concrete, are believed to be most suitable for floor and riser. Because privy units are commonly used as urinals, the use of impervious materials for risers is desirable in the interest of cleanliness. In cold climates, wood treated with a preservative, such as creosote, has been found to be durable and to reduce the problem of condensation. Therefore, in some sections of the country, wood may be used if approved by the State health authority.

Seat and Lid.—Both seat and lid should be hinged to permit raising. Material used in construction should be light in weight, but durable. Seats should be comfortable. Lids shall be self-closing. Two objections to self-closing seat lids are discomfort from the lid resting on the upper portion of the user's back, and contact of the oftentimes soiled or frost-covered bottom surface of the lid with the user's clothing. A seat lid has been devised which overcomes these objections. This lid is raised to a vertical position [illegible] lifting it from the rear, so that the top surface of the lid is against the user, rather than the bottom surface which is normally exposed to the pit.

Vent.—Venting practices differ in many parts of the United States, because of differences in climatic conditions. In some States, particularly those in the South, vents have been omitted entirely and results from this practice appear to be satisfactory. Vents may pass vertically from either the pit or the riser, through the roof or directly through the wall near the floor; the vertical vent from pit or riser may lead to a horizontal vent passing through both walls or diagonally across a corner of the building.

In all cases, vents are screened. Galvanized, steel-wire screens dipped in paint, copper screens, and bronze screens are used. Nearly all designs employ a screen with 16 meshes to the inch. Hardware cloth is used to cover the outside entrance to vents to prevent entrance of large objects which would clog the vent.

It is stated by some authorities that venting serves no useful purpose and that vents should be eliminated from earth pit privies. Satisfactory recommendations with respect to vents can be made only after certain technical problems have been solved. The most important of these is the moisture condensation problem due to the temperature difference between the pit and the superstructure. The use of a cold wall, to condense moisture within the pit, has been suggested. In view of the uncertain value of venting, no recommendations are offered.

Superstructure.—Privy structures are standardized to some extent. The majority are 4 x 4 feet in plan, with a height of 6½ feet in front, and 5½ feet at the rear. A roof with a 1-to-4 slope is commonly used. The building should be constructed of substantial material, painted for resistance to weather, and fastened solidly to the floor slab. Proper roof overhang should be provided to dispatch rainwater from the roof away from the mound.

The roof should be constructed of watertight materials, such as wood, composition shingles, or metal. Achieving ventilation of the building by omitting siding beneath the roof is common, except in cold climates, where the siding is usually perforated. Windows are sometimes used in the northern latitudes. Provision of coathooks is desirable.

Defects in Earth-Pit Privies.—The following shall be considered defects in pit-toilet installations: (1) evidence of caving around the edges of the pit; (2) signs of overflow, or other evidence that the pit is full; (3) seat covers broken, open, not self-closing; (4) broken, perforated, or unscreened vent pipe; (5) uncleanliness of any kind in the toilet building; (6) toilet room opening directly into milkroom; and (7) evidence of light entering pit, except through seat when seat cover is raised.

MASONRY-VAULT PRIVY

A masonry-vault privy is essentially a pit privy in which the pit is lined with impervious materials, and in which provision is made for the removal of excreta.

Function.—Masonry vaults are used chiefly where the ground water table is close to the ground surface, or where it is necessary to prevent contamination of nearby water courses, wells, and springs. They are also recommended for use in limestone formations, to prevent contamination of water streams in the solution channels of the limestone. This type of disposal unit is satisfactory only where adequate maintenance and servicing are assured.

Construction.—Masonry vaults may be constructed of brick, stone, or concrete, with the last preferred. Vaults must be watertight to keep out ground water and to prevent leakage of the vault's contents. A readily accessible clean-out door is necessary, so constructed as to prevent access of flies, animals, and surface water to the vault's contents. The floor of the superstructure, which forms a partial covering for the vault, must be impervious; concrete is recommended.

CHEMICAL TOILET

In areas where pit toilets might menace water supplies, and where a sufficient volume of water for the operation of flush toilets is not available, and where there is no prohibitive statute or obedience, the chemical toilet may be accepted, provided that it: (1) Has a receiving tank of acid resisting material with an opening easily accessible for cleaning; (2) has a bowl, of nonabsorbent materials sufficiently elevated above the receiving basin to prevent splashing the user; (3) has the tank and bowl vented with at least a 3-inch screened pipe, preferably of cast iron, extending at least 2 feet above the roof line; (4) has the tank charged, at proper intervals, with chemicals of a bactericidal nature and concentration; (5) is placed in a well lighted and well ventilated room which does not open directly into the milkroom; and (6) has an effective method of final disposal, including burial, or a leaching vat, or a cesspool where it will not endanger any water supply.

Type.—There are, in general, two types of chemical toilets: (1) The commode type, in which a pail containing a chemical solution is placed immediately below the seat; (2) the tank type, in which a metal tank holding the chemical solution is placed in the ground directly beneath the seat. A pipe or conduit connects the riser with the tank. Tanks are usually cleaned by draining to a subsurface seepage pit. Chemical toilets differ from privies, in that they are commonly placed inside the dwelling, whereas privies are generally located apart from the dwelling.

Function.—Toilets of this type are predominant in cold climates, where it is found desirable to have toilet facilities in or near the home, and where running water is not available for flush toilets.

Chemicals.—Sodium hydroxide is commonly used to prepare the caustic solution for either commode or tank type chemical toilets. The chemical is dissolved in water and placed in the receptacle. The purpose of the chemical solution is to emulsify the fecal matter and paper, and to liquefy the contents. In order to accomplish this action, the chemical solution must be maintained at proper strength, and the mixture must be agitated each time the toilet is used. Odors are produced chiefly by the liberation of ammonia when the caustic solution is weak, or when mixing by agitation is not carried out.

Difficulties are encountered when the caustic solution becomes diluted and fails to emulsify the fecal matter. When this occurs, the chemical solution breaks down, due to absorption of carbon dioxide from the air, and the solution ceases to be caustic. The decomposition of fecal matter which takes place in such instances produces foul odors.

Sludge Disposal.—Disposal of the resultant mixture is a disagreeable task. In the case of small commode types, the usual method of disposal is burial in the earth. Tank units are usually so constructed that the tank is emptied into a seepage pit. When emulsification is not complete, particles of paper clog the seepage pit requiring corrective measures. Because of fundamental differences in design, chemical toilets resemble other types of privies only in the seat construction and manner of venting. Usually, risers or stools manufactured commercially are used.

Chemical toilets shall be used only where there is assurance of constant maintenance, and where safe disposal of the contents is assured. Neither sludge nor liquid effluent from chemical toilet tanks shall be discharged to a sewerage system in which treatment processes are involved. Otherwise, the chemical constituents of the sludge or liquid effluent may seriously interfere with the biological action upon which such treatment processes depend.

Defects.—The following shall be considered defects in a chemical toilet installation: (1) violation of any of the above requirements; (2) disagreeable odors indicating too-infrequent charging with chemicals or inadequate concentration of chemicals in the charge; (3) evidence of improper disposal of the tank contents; and (4) lack of cleanliness in the toilet compartment and room.

CONSTRUCTION PLANS

Detailed construction drawings for septic tanks, pit privies, masonry-vault privies, and chemical toilets complying with State regulations may be secured from the State health authority.

APPENDIX D. STANDARDS FOR WATER SOURCES

I. Location of Water Sources

DISTANCE FROM SOURCES OF CONTAMINATION

Every well or source of water shall be located at a safe distance from any source of contamination as determined by a detailed sanitary survey. This distance shall be not less than 50 feet from any pit, privy, septic tank, or accumulated manure and not less than 100 feet from any cesspool, seepage pit, or subsurface sewage disposal field except as provided in the following paragraphs.

Surface Contamination.—A properly constructed well shall exclude surface water from a ground water source to the same degree as does the undisturbed overlying geologic formation. The well site shall not be subject to flooding and should be graded to facilitate the rapid drainage of surface water. The following precautions will insure reasonable protection against entry of surface water.

1. The grade shall be sloped away from the well to divert surface water. The area shall be filled, if necessary, graded, and maintained to prevent the accumulation or retention of surface water within 50 feet of the well in all directions. The fill shall be protected from erosion by riprap or sod where necessary. For a well on a hillside, adequate intercepting ditches shall be constructed on the uphill side of the well to keep runoff at least 50 feet away from it in all directions. These ditches shall have the capacity to carry the runoff of heavy storms and should be properly maintained.

2. Pump platforms, pumproom floors, or well covers shall be located not less than 2 feet above the highest known high-water level of any nearby body of water. The area around the well shall be filled and graded to the necessary height.

Sewer Near Wells.—No floor drain, soil pipe, main drain, or other pipe, which is directly connected to a storm or sanitary sewer, or through which water or sewage from any source may back up, shall be located closer than 10 feet from any well: *Provided*, That pipes and drains through which sewage or waste water flows to a sewer, unless constructed of cast iron pipe with leaded joints, or its equivalent, shall be at least 50 feet from any such water source and: *Provided further*, That this requirement may be waived in the case of milkhouse waste water drains which discharge to the surface of the ground.

Leakage From Toilets or Sewers.—No toilet, sewer, soil pipe, or drain shall be located over, or where leakage therefrom can reach, any water-storage basis, reservoir, source of water supply, or pumping equipment.

Pits Near Wells.—There shall be no pit or unfilled space below ground-surface level, any part of which is within 10 feet of the source of water supply: *Pro-*

vided, That this requirement shall not apply to a residential basement which may be located closer than 10 feet to a driven or drilled well.

Sewers Near Waterlines.—No water pipe shall be located closer than 10 feet, measured horizontally, to any sewer, soil pipe, or drain, which may at any time contain polluted water; and such pipes shall be separated by undisturbed or compacted earth: *Provided,* That when permitted by States and local health authorities, pressure water pipes may be placed in the same trench with the building drain and building sewer, or may cross such lines, under the following conditions: (1) the bottom of the water pipe shall be at least 12 inches above the top of the sewer line at its highest point; (2) the water pipe shall be placed on a solid shelf excavated at one side of the common trench; (3) the number of joints in the water pipe shall be kept to a minimum; (4) the materials and joints of sewer and water pipe shall be installed in such manner and shall possess the necessary strength and durability to prevent the escape of solids, liquids, and gases under all known adverse conditions, such as corrosion, strains due to temperature changes, settlement, vibrations, and superimposed loads; and (5) where a water line must cross over a sewer line, the sewer line shall be of cast iron with leaded or mechanical joints (or equivalent) at least 10 feet on either side of the crossing.

II. Construction

WELLS

Well Casing or Lining.—All that part of the suction pipe or drop pipe of any well within ten feet of and below the ground surface shall be surrounded by a watertight casing pipe extending above the ground, platform, or floor surface, as the case may be, and covered at the top as herein provided. The casing of every well shall terminate above the ground level; the annular space outside the casing shall be filled with a watertight cement grout or clay with similar sealing properties from the surface to a minimum of 10 feet below the ground surface. The casing of those wells with cement grout shall be surrounded at the ground surface by a 4-inch concrete slab extending at least 2 feet in all directions. A dug well, in lieu of a casing pipe, may be provided with a substantial watertight lining of concrete, vitrified tile with outer concrete lining, or other suitable material. Such lining shall extend at least 10 feet below the surface and shall extend up to the well platform or pumproom floor with a watertight connection. In such case, the platform or floor shall have a suitable sleeve pipe, surrounding the suction pipe or drop pipe, and projecting above as herein provided for a casing pipe.

Covers.—Every well shall be provided with an overlapping watertight cover at the top of the casing or pipe sleeve. Every cover, pump platform, or pumproom floor shall be watertight, and elevated above the adjacent land level (see *Well Pits and Drainage* below). Its surface shall be sloped to provide drainage, thus facilitating the rapid removal and diversion of surface and waste water away from the well. These units shall be constructed of watertight concrete, properly reinforced, and sloped downward from the center of the well casing or sleeve to the outer edges of the slab. The slab or pumproom floor shall have a minimum thickness of 4 inches.

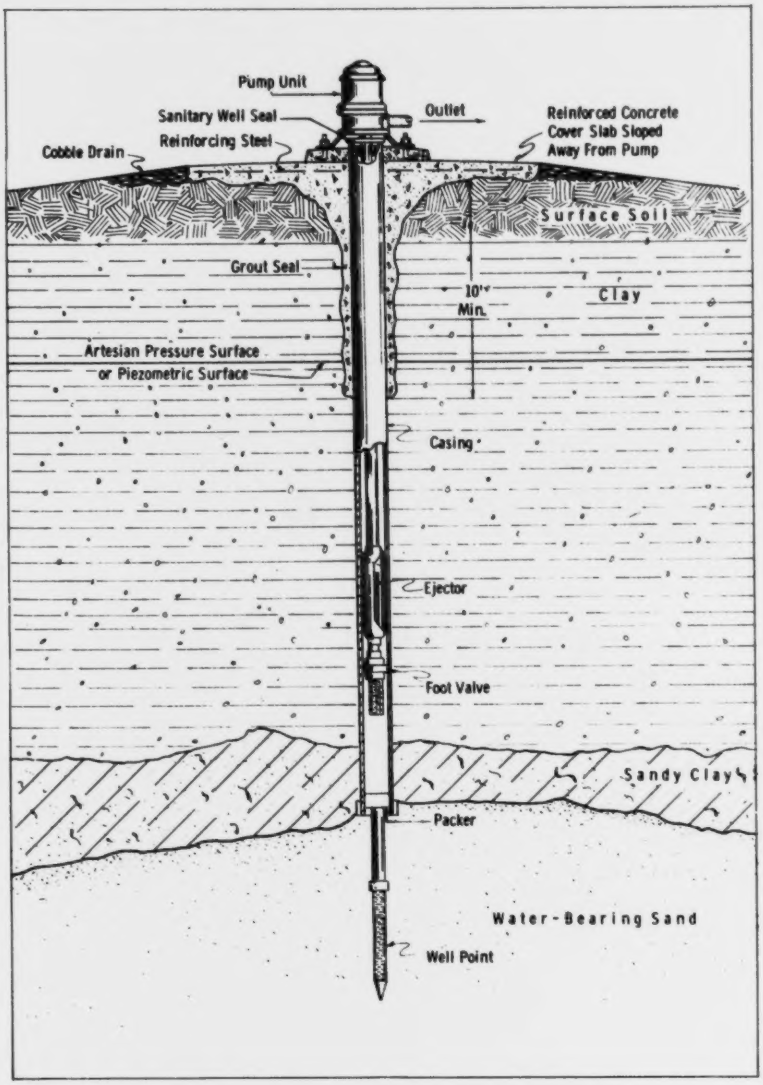
Pump Unit
Sanitary Well Seal
Reinforcing Steel
Cobble Drain
Outlet
Reinforced Concrete Cover Slab Sloped Away From Pump
Surface Soil
Grout Seal
10' Min.
Clay
Artesian Pressure Surface or Piezometric Surface
Casing
Ejector
Foot Valve
Sandy Clay
Packer
Water-Bearing Sand
Well Point

FIGURE 1.—Bored well with driven well point.

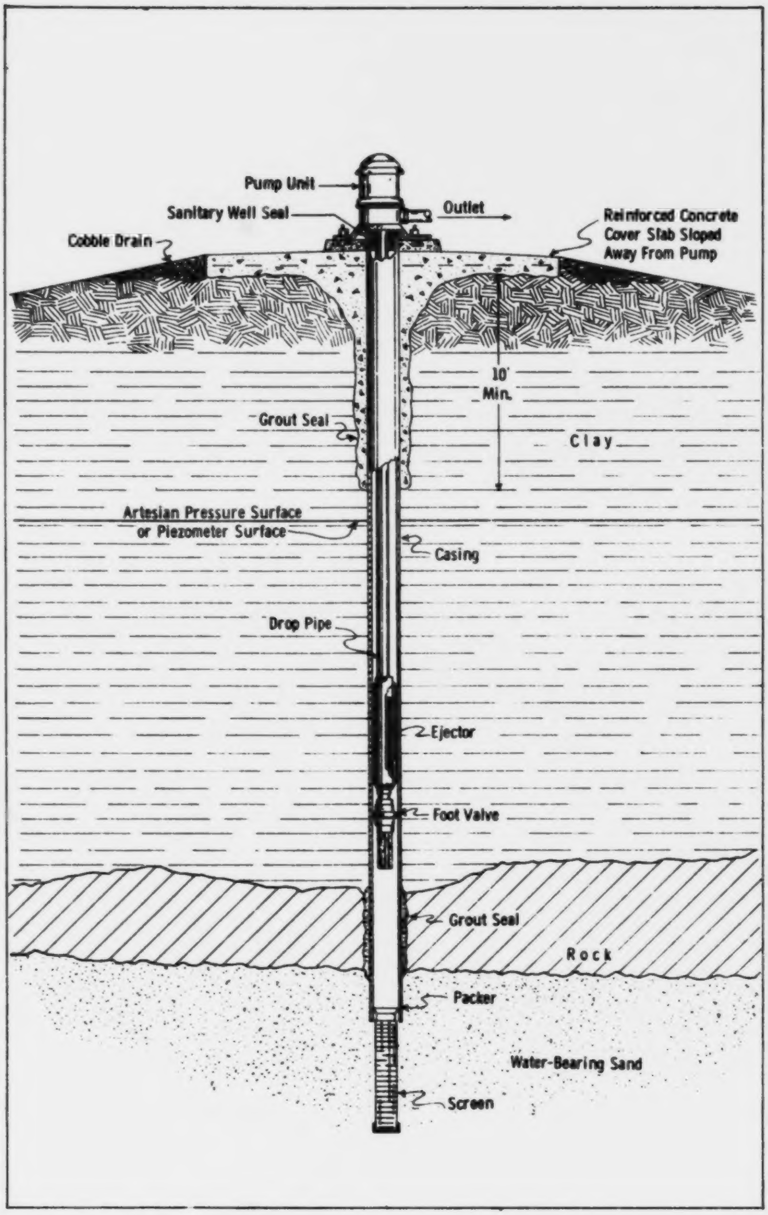
Pump Unit
Sanitary Well Seal
Outlet
Reinforced Concrete Cover Slab Sloped Away From Pump
Cobble Drain
10' Min.
Grout Seal
Clay
Artesian Pressure Surface or Piezometer Surface
Casing
Drop Pipe
Ejector
Foot Valve
Grout Seal
Rock
Packer
Water-Bearing Sand
Screen

FIGURE 2.—Drilled well.

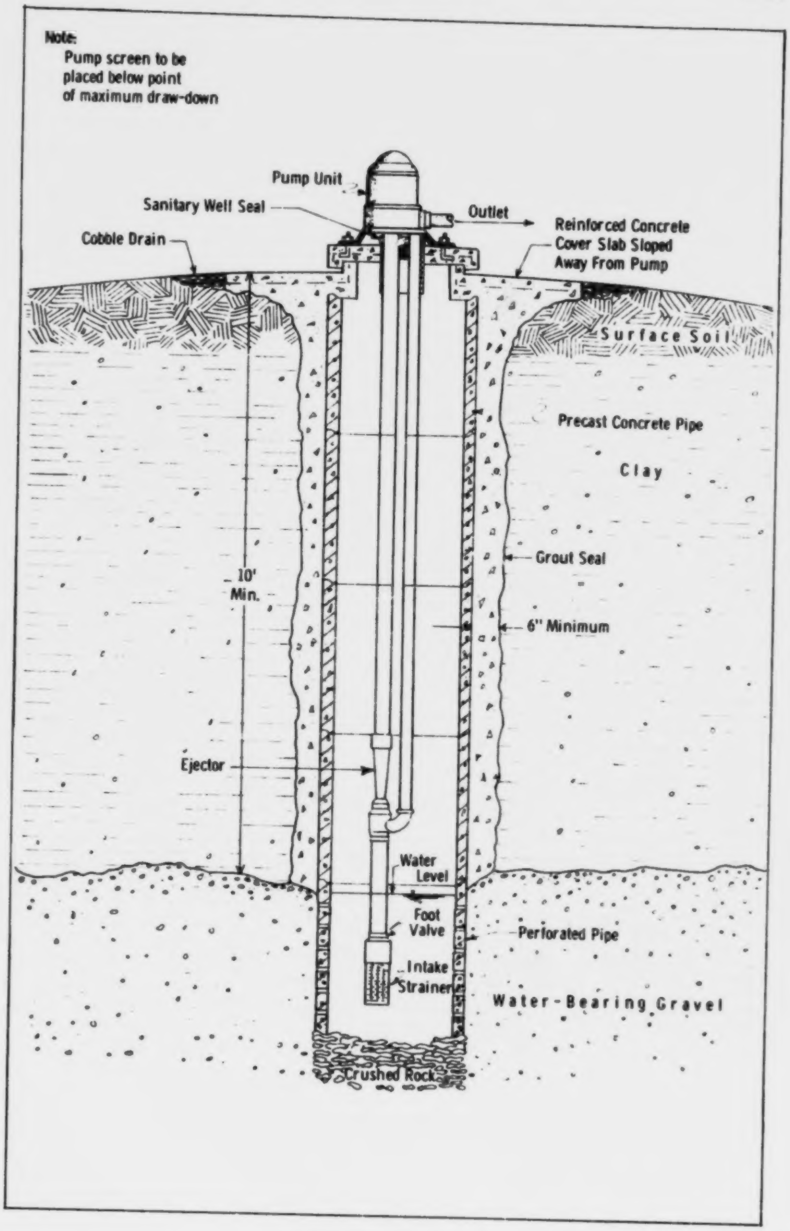
Note:
Pump screen to be placed below point of maximum draw-down
Pump Unit
Sanitary Well Seal
Outlet
Cobble Drain
Reinforced Concrete Cover Slab Sloped Away From Pump
Surface Soil
Precast Concrete Pipe
Clay
Grout Seal
10' Min.
6" Minimum
Ejector
Water Level
Foot Valve
Perforated Pipe
Intake Strainer
Water-Bearing Gravel
Crushed Rock

FIGURE 3.—Dug well.

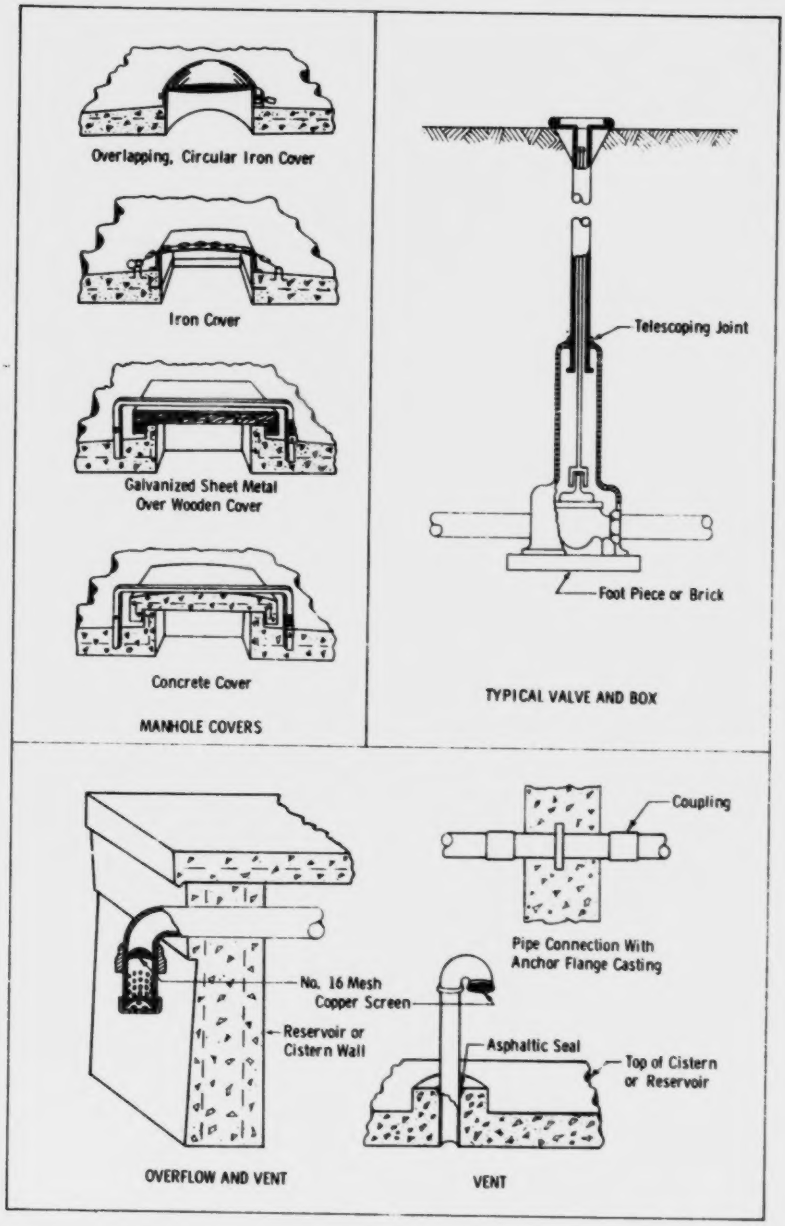
Overlapping, Circular Iron Cover
Iron Cover
Galvanized Sheet Metal Over Wooden Cover
Concrete Cover
MANHOLE COVERS
Telescoping Joint
Foot Piece or Brick
TYPICAL VALVE AND BOX
Coupling
Pipe Connection With Anchor Flange Casting
No. 16 Mesh Copper Screen
Reservoir or Cistern Wall
Asphaltic Seal
Top of Cistern or Reservoir
OVERFLOW AND VENT
VENT

FIGURE 4.—Typical valve and box, manhole covers and piping installations.

Power-Pump Base.—The base plate of a power-operated pump placed immediately over the well shall be designed to form a watertight seal with the well cover or casing. The casing or pipe sleeve shall extend at least 6 inches above the pumproom floor or platform slab, and at least 1 inch into the pump base. In installations where the pump is not installed directly over the well, or where an open-type pump base is used, the well casing or pipe sleeve shall extend at least 6 inches above the floor of the pumphouse, and the annular space between the casing and the suction pipe shall be closed with an acceptable watertight packing or seal.

Well Pits and Drainage.—Because of the pollution hazards involved, the well head, well casing, pump, pumping machinery, valve connected with the suction pump, or exposed suction pipe shall not be permitted in any pit, room, or space extending below ground level, or in any room or space above the ground which is walled-in or otherwise enclosed so that it does not have free drainage by gravity to the surface of the ground: *Provided*, That a dug well properly constructed, lined, and covered as herein prescribed shall not be construed to be a pit: *Provided further*, That pumping equipment and appurtenances may be located in a residential basement which is not subject to flooding: *And provided further*, That in the case of existing water supplies which otherwise comply with the applicable requirements of this appendix, pit installations may be accepted under the following conditions when permitted by the State health authority:

1. Pits shall be of watertight construction, with walls extending at least 6 inches above the established ground surface at all points.
2. Pits shall be provided with a watertight, concrete floor, sloping to a drain which discharges to the ground surface at a lower elevation than the pit, and preferably at least 30 feet from it; or if this should be impossible, to a watertight, concrete sump in the pit, equipped with a sump-pump discharging to the ground surface, preferably at least 30 feet from the pit.
3. Pits shall be provided with a concrete base for pumps, or pumping machinery, so that such units shall be located at least 12 inches above the floor of the pit.
4. Pits shall be provided with a watertight housing or cover in all cases.
5. If inspection should reveal that these conditions are not being properly maintained, the supply shall be disapproved.

Manholes.—Manholes may be provided on dug wells, reservoirs, tanks, and other similar features of water supplies. A manhole, if installed, shall be provided with a curb, the top of which extends at least 4 inches above the slab and shall be equipped, where necessary for physical protection, with a locked or bolted overlapping watertight cover, the sides of which extend downward at least 2 inches. The covers shall be kept closed at all times, except when it may be necessary to open the manhole.

Vent Opening.—Any reservoir, well, tank, or other structure containing water for the dairy water supply may be provided with vents, overflows, or water-level control gages, which shall be so constructed as to prevent the entrance of birds, insects, dust, rodents, or contaminating material of any kind. Openings on vents shall be not less than 18 inches above the floor of a pumproom, or of the roof or cover of a reservoir. Vent openings on other structures shall be at least 18 inches above the surface on which the vents are located. Vent openings shall be turned down and screened with corrosion-resistant screen of not less than 16 x 20 mesh. Overflow outlets shall discharge above and not less than 6 inches from a roof or roof drain, floor or floor drain, or over an open

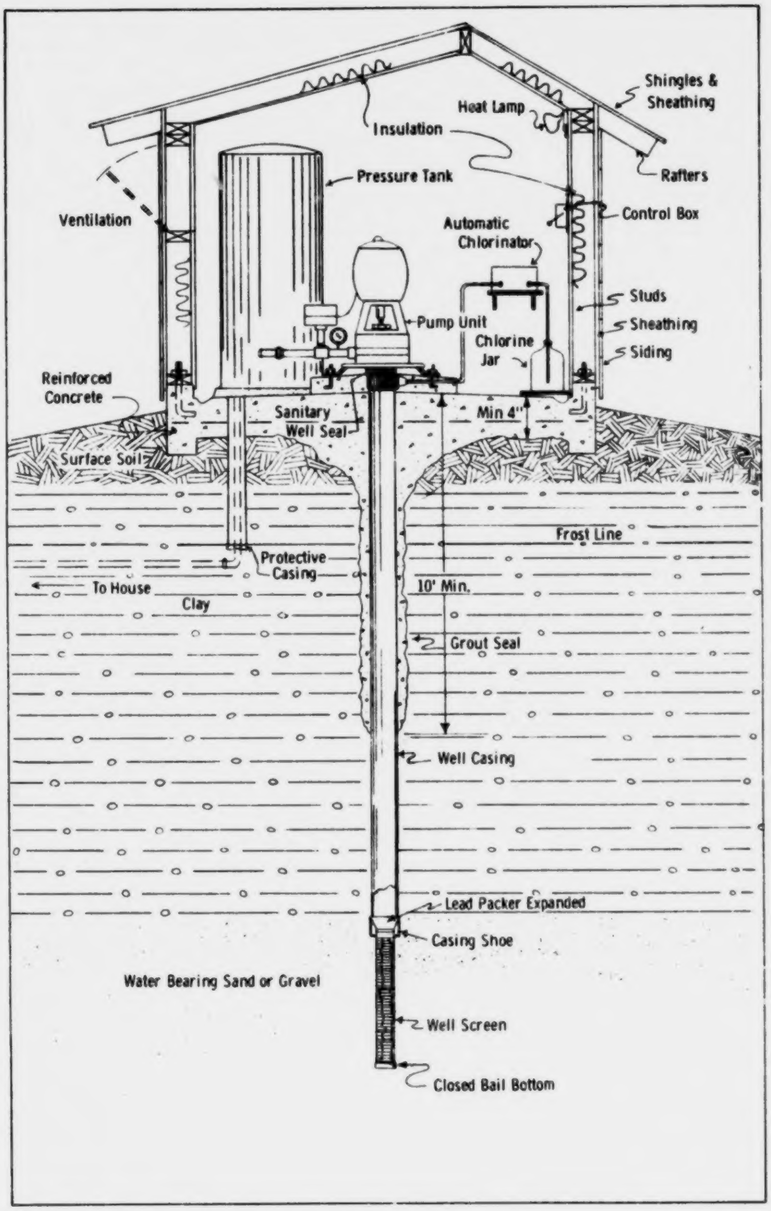
Shingles &
Sheathing
Heat Lamp
Insulation
Rafters
Pressure Tank
Ventilation
Control Box
Automatic
Chlorinator
Studs
Pump Unit
Sheathing
Chlorine
Jar
Siding
Reinforced
Concrete
Sanitary
Well Seal
Min 4"
Surface Soil
Frost Line
Protective
Casing
To House
10' Min.
Clay
Grout Seal
Well Casing
Lead Packer Expanded
Casing Shoe
Water Bearing Sand or Gravel
Well Screen
Closed Bail Bottom

Figure 5.—Pumphouse.

water-supplied fixture. The overflow outlet shall be covered by a corrosion-resistant screen of not less than 16 x 20 mesh and by one-quarter-inch hardware cloth, or shall terminate in a horizontal angle seat check valve.

Airlift Systems.—The air intake for any airlift system or mechanical aerating apparatus shall be at least 6 feet above the floor surface if indoors, and 10 feet above the ground if out of doors, and 2 feet above the roof or building through which it might project. The air intake shall be so constructed as to prevent the entrance of birds, insects, rodents, dust, or contaminating material of any kind. Every airlift system shall be equipped with effective oil traps, tanks, or filters, to prevent oil from entering the water.

Lubrication of Pump Bearings.—Pump bearings situated in any well below the pumproom floor shall be lubricated with water taken from within the well, or from a reservoir or distribution system which is supplied with water from the original sources of the water supply, or from another supply approved by the State health authority.

Priming of Power Pumps.—Water for priming pumps on any water system shall be taken directly from a reservoir or distribution system which is supplied with water from the original source of the water supply, or from another supply approved by the State health authority. Priming devices shall be constructed to prevent exposure of the water to sources of contamination.

SPRINGS

Springs are utilized as a source of water in some rural areas. Unlike wells, which generally fit into certain categories of construction, springs are almost invariably individual in nature. Their protection must be carefully tailored to take into account the peculiarities of the sites in which they are found. Special attention must be given to means of excluding surface water from catchment facilities.

In general, a satisfactory spring encasement must include: (1) an open bottom, watertight basin intercepting the source which extends to bedrock or a system of collection pipes and a storage tank; (2) a cover which excludes both surface drainage and debris from the storage or catchment area; (3) provision for cleanout; (4) provision for overflow; and (5) a connection to the distribution system.

These additional precautions are also recommended:

1. Provide for the removal of surface drainage from the site. A surface drainage ditch located at least 50 feet away on the uphill side of the spring will prevent contaminating material from entering the source.

2. Construct a suitable fence an appropriate distance from the water source to prevent entry of livestock. The drainage ditch should be inside the fence at all points uphill from the source.

3. Provide for access to the tank for maintenance, but prevent removal of the cover by a suitable locking device.

4. Monitor the quality of the spring water with periodic checks for contamination. A marked increase in turbidity after a storm is a good indication that surface runoff is reaching the spring.

SURFACE WATER

The use of surface water should not be considered unless ground water sources are undependable or unavailable. When ground water supplies are limited and accordingly reserved for milkhouse and domestic use only, surface water may be employed without treatment for stock watering, gardening, and similar uses.

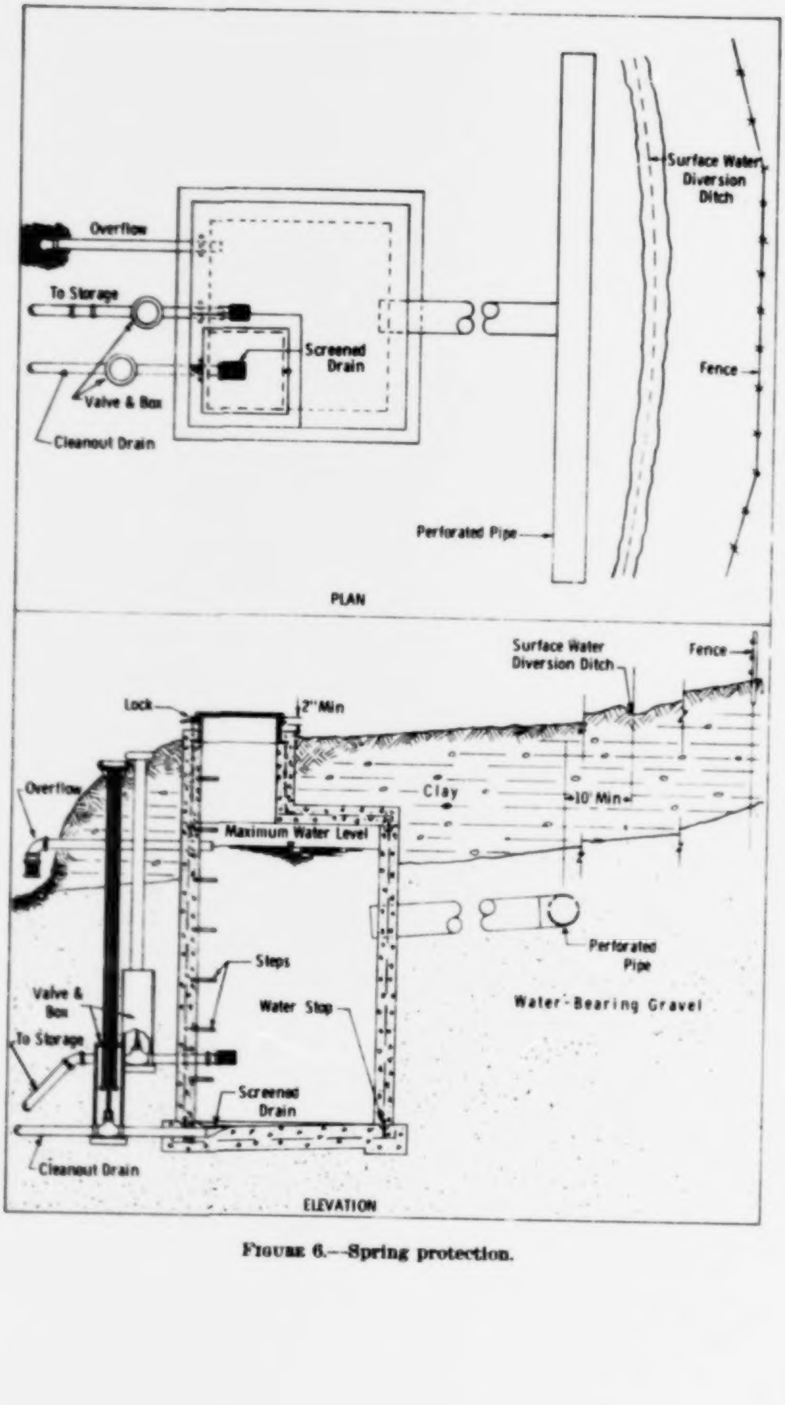
Overflow
To Storage
Valve & Box
Cleanout Drain
Screened Drain
Surface Water Diversion Ditch
Fence
Perforated Pipe
PLAN
Surface Water Diversion Ditch
Fence
Lock
2" Min
Overflow
Clay
10' Min
Maximum Water Level
Perforated Pipe
Steps
Water-Bearing Gravel
Valve & Box
Water Stop
To Storage
Screened Drain
Cleanout Drain
ELEVATION

FIGURE 6.—Spring protection.

Where resort must be made to surface water for all uses, a wide variety of sources, including farm ponds, lakes, streams, and the roof runoff of buildings may be considered. These sources are regarded, without exception, to be contaminated, and their use cannot be condoned unless an individually tailored treatment process can be used which will make them safe and satisfactory. Such treatment may include aeration and the use of suitable filtration or precipitation devices to remove suspended matter, in addition to routine full-time disinfection.

The milk producer or milk plant operator, who is considering surface sources of water for milking, milkhouse, and milk plant operations shall receive the advance approval of the health authority and shall comply with all applicable requirements of the State health authority on the construction, protection, and treatment of the chosen supply.

CONDENSER WATER OR WATER USED TO PRODUCE VACUUM

Condensing water for milk evaporators and water used to produce vacuum and/or to condense vapors in vacuum-heat processing equipment shall come from an approved source: *Provided*, That when approved by the health authority, sources which do not comply with the requirements of this *Ordinance* may be used if the evaporator or vacuum-heat equipment is so constructed and controlled as to preclude contamination of the evaporator or its contents by condensing water. Means of preventing such contamination are: (1) use of a surface type condenser in which the condensing water is physically separated from the vapors and condensate, or (2) use of reliable safeguards to prevent the overflow of condensing water from the condenser into the evaporator. Such safeguards include a barometric leg extending at least 35 feet vertically from the invert of the outgoing condensing water line to the free level at which the leg discharges, or a safety shutoff valve, located on the water feed line to the condenser, automatically actuated by a control which will shut off the inflowing water when the water level rises above a predetermined point in the condenser. This valve may be actuated by water, air, or electricity, and is so designed that failure of the primary motivating power will automatically stop the flow of water into the condenser.

Note.—Public Health Service Publication No. 24, *Manual of Individual Water Supply Systems*, is an excellent source of detailed information on the subject; it also contains a suggested well-drilling code.

III. Disinfection of Water Sources

All newly constructed or newly repaired wells shall be disinfected to counteract contamination introduced during construction or repair. Every well shall be disinfected immediately after construction or repair, and flushed prior to bacteriological testing.

An effective and economical method of disinfecting wells and appurtenances is the use of calcium hypochlorite containing approximately 70 percent available chlorine. This chemical can be purchased in granular form at hardware stores, swimming pool equipment supply outlets, or chemical supply houses.

When used in the disinfection of wells, calcium hypochlorite should be added in sufficient amounts to provide a dosage of approximately 50 mg. available chlorine per liter in the well water. This concentration is roughly equivalent to a mixture of 1 ounce of dry chemical per 100 gallons of water to be disinfected.

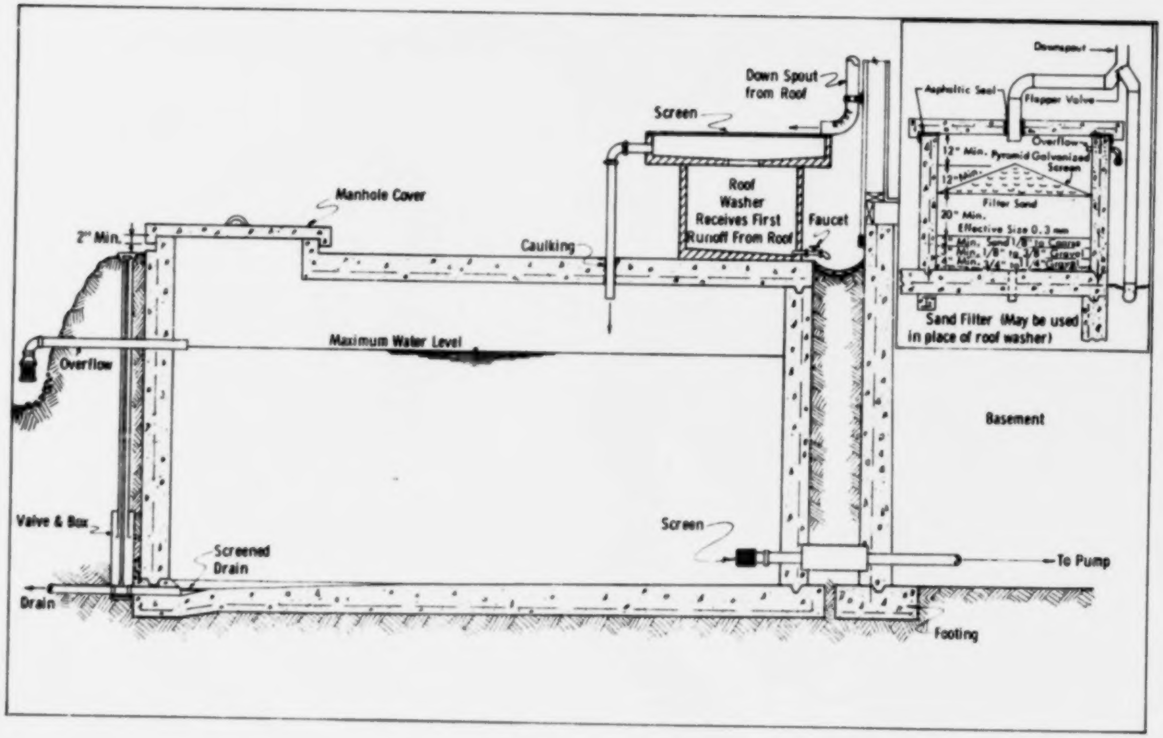
Down Spout from Roof
Screen
Roof Washer Receives First Runoff From Roof
Faucet
Manhole Cover
Caulking
2" Min.
Overflow
Maximum Water Level
Valve & Box
Screened Drain
Drain
Screen
To Pump
Footing
Basement
Downspout
Asphaltic Seal
Flapper Valve
Overflow
12" Min.
Pyramid Galvanized Screen
12" Min.
Filter Sand
20" Min.
Effective Size 0.3 mm
3" Min. Sand 1/8" to Coarse
3" Min. 1/8" to 3/8" Gravel
4" Min. 3/4" to 1 1/4" Gravel
Sand Filter (May be used in place of roof washer)

FIGURE 7.—Cistern.

A stock solution of disinfectant may be prepared by mixing 1 ounce of high-test hypochlorite with 2 quarts of water. Mixing is facilitated if a small amount of the water is first added to the granular calcium hypochlorite and stirred to a smooth watery paste free of lumps. The stock solution should be stirred thoroughly for 10 to 15 minutes; the inert ingredients should then be allowed to settle. The liquid containing the chlorine should be used and the inert material discarded. Each 2 quarts of stock solution will provide a concentration of approximately 50 mg/l when added to 100 gallons of water. The solution should be prepared in a clean utensil; the use of metal containers should be avoided as they are corroded by strong chlorine solutions. Crockery, glass, or rubberlined containers are recommended.

Where small quantities of disinfectant are required and a scale is not available, the material can be measured with a spoon. A heaping tablespoonful of granular calcium hypochlorite weighs approximately one-half ounce.

When calcium hypochlorite is not available, other sources of available chlorine such as sodium hypochlorite (12–15 percent of volume) can be used. Sodium hypochlorite, which is also commonly available as liquid household bleach with 5.25 percent available chlorine, can be diluted with two parts of water to produce the stock solution. Two quarts of this solution can be used for disinfecting 100 gallons of water.

Stock solutions of chlorine in any form will deteriorate rapidly unless properly stored. Dark glass or plastic bottles with airtight caps are recommended. Bottles containing solution should be kept in a cool place and protected from direct sunlight. If proper storage facilities are not available, the solution should always be prepared fresh, immediately before use.

Complete information concerning the test for residual chlorine is included in *Standard Methods for the Examination of Water and Wastewater*, published by the American Public Health Association.

DUG WELLS

After the casing or lining has been completed, follow the procedure outlined below:

1. Remove all equipment and materials which will not form a permanent part of the completed structure.
2. Using a stiff broom or brush, wash the interior walls of the casing or lining with a strong solution (100 mg/l of chlorine) to insure thorough cleaning and sanitizing.
3. Place the cover over the well and pour the required amount of chlorine solution into the well through the manhole or pipe opening just before inserting the pump cylinder and drop-pipe assembly. The chlorine solution should be distributed over as much of the surface of the water as possible to obtain proper diffusion of the chemical through the water hose or pipeline as the line is being alternately raised and lowered. This method should be followed whenever possible.
4. Wash the exterior surface of the pump cylinder and drop pipe with the chlorine solution as the assembly is being lowered into the well.
5. After the pump has been set in position, pump water from the well and through the entire water distribution system to the milkroom until a strong odor of chlorine is noted.
6. Allow the chlorine solution to remain in the well for at least 24 hours.
7. After 24 hours or more have elapsed, flush the well to remove all traces of chlorine.

DRILLED, DRIVEN, AND BORED WELLS

After the casing or lining has been completed, follow the procedure outlined below:

1. Remove all equipment and materials which will not form a permanent part of the completed structure.
2. When the well is being tested for yield, the test pump should be operated until the well water is as clear and as free from turbidity as possible.
3. After the testing equipment has been removed, slowly pour the required amount of chlorine solution into the well just before installing the permanent pumping equipment. Diffusion of the chemical with the well water may be facilitated as previously described.
4. Wash the exterior surface of the pump cylinder and drop pipe with chlorine solution as the assembly is being lowered into the well.
5. After the pump has been set in position, operate the pump until water discharge through the entire distribution system to waste has a distinct odor of chlorine. Repeat this procedure a few times at 1-hour intervals to insure complete circulation of the chlorine solution through the column of water in the well and the pumping equipment.
6. Allow the chlorine solution to remain in the well for at least 24 hours.
7. After 24 hours or more have elapsed, flush the well to remove all traces of chlorine. The pump should be operated until water discharged to waste is free from the chlorine odor.

In the case of deep wells having a high water level, it may be necessary to resort to special methods of introducing the disinfecting agent into the well so as to insure proper diffusion of chlorine throughout the well. The following method is suggested.

Place the granulated calcium hypochlorite in a short section of pipe capped at both ends. A number of small holes should be drilled through each cap or into the sides of the pipe. One of the caps should be fitted with an eye to facilitate attachment of a suitable cable. The disinfecting agent is distributed when the pipe section is lowered or raised throughout the depth of the water.

WATER-BEARING STRATA

Sometimes a well is encountered that does not respond to the usual methods of disinfection. A well like this has usually been contaminated by water that entered under sufficient head to displace water into the water-bearing formation. The displaced water carries contamination with it. The contamination that has been carried into the water-bearing formation can be eliminated or reduced by forcing chlorine into the formation. Chlorine may be introduced in a number of ways, depending on the construction of the well. In some wells, it is advisable to chlorinate the water and then add a considerable volume of a chlorine solution in order to force the treated water into the formation. When this procedure is followed, all chlorinated water should have a chlorine strength of approximately 50 mg/l. In other wells, such as the drilled well cased with standard weight casing pipe, it is entirely practicable to chlorinate the water, cap the well, and apply a head of air. When air is alternately applied and released, a vigorous surging effect is obtained and chlorinated water is forced into the water-bearing formation. In this procedure, the chlorine strength of the treated water in the well will be reduced by dilution as it mixes with the water in the water-bearing formation. It is, therefore, advisable to double or triple the quantity of chlorine compound to be used so as to have a chlorine strength of 100 to 150 mg/l in the well as the surging process is started. After treating a well in this manner, it is necessary to flush it to remove the excess chlorine.

DISINFECTION OF SPRINGS

Springs and encasements should be disinfected by a procedure similar to that used for dug wells. If the water pressure is not sufficient to raise the water to the top of the encasement, it may be possible to shut off the flow and thus keep the disinfectant in the encasement for 24 hours. If the flow cannot be shut off entirely, arrangements should be made to supply disinfectant continuously for as long a period as practicable.

DISINFECTION OF WATER DISTRIBUTION SYSTEMS

These instructions cover the disinfection of water distribution systems and attendant standpipes or tanks. It is always necessary to disinfect a water system before placing it in use under the following conditions:

1. Disinfection of a system which has been in service with raw or polluted water, preparatory to transferring the service to treated water.
2. Disinfection of a new system upon completion and preparatory to placing in operation with treated water or water of satisfactory quality.
3. Disinfection of a system after completion of maintenance and repair operations.

The entire system, including tank or standpipe, should be thoroughly flushed with water to remove any sediment which may have collected during operation with raw water. Following flushing, the system should be filled with a disinfecting solution of calcium hypochlorite and treated water. This solution is prepared by adding 1.2 pounds of high-test 70 percent calcium hypochlorite to each 1,000 gallons of water. A mixture of this kind provides a solution having not less than 100 mg/l of available chlorine.

The disinfectant should be retained in the system, tank, or standpipe, if included, for not less than 24 hours, then examined for residual chlorine and drained out. If no residual chlorine is found present, the process should be repeated. The system is next flushed with treated water and put into operation.

IV. Continuous Water Disinfection

Water supplies which are otherwise deemed satisfactory but which prove unable to meet the bacteriological standards prescribed herein shall be subjected to continuous disinfection. The individual character of the supply shall be investigated and a treatment program developed which shall produce a safe supply as determined by bacteriological testing (App. G, p. 134).

For numerous reasons, including economy, effectiveness, stability, ease of use, and availability, chlorine is by far the most popular chemical agent employed for the disinfection of water supplies. The amount necessary to provide adequate protection varies with the supply and the amount of organic and other oxidizable material which it contains. Proper disinfecton can only be assured when a residual concentration of chlorine remains for bactericidal activity after the demands of these other substances are met. In general, these factors exert the most important influences on the bactericidal efficiency of chlorine:

1. Free chlorine residual—the higher the residual, the more effective the disinfection and the faster the disinfection rate.
2. Contact time between the organism and the disinfectant—the longer the time, the more effective the disinfection.
3. Temperature of the water in which contact is made—the lower the temperature, the less effective the disinfection.
4. The pH of the water in which contact is made—the higher the pH, the less effective disinfection.

For example, when a high pH and low temperature combination is encountered in a water, either the concentration of chlorine or the contact time must be increased. Likewise, chlorine residual will need to be increased if sufficient contact time is not available in the distribution system before the water reaches the first user.

SUPERCHLORINATION—DECHLORINATION

Superchlorination.—The technique of superchlorination involves the use of an excessive amount of chlorine to destroy quickly the harmful organisms which may be present in the water. If an excessive amount of chlorine is used, a free chlorine residual will be present. When the quantity of chlorine is increased, disinfection is faster and the amount of contact time required to insure safe water is decreased.

Dechlorination.—The dechlorination process may be described as the partial or complete reduction of any chlorine present in the water. When dechlorination is provided in conjunction with proper superchlorination, the water will be both properly disinfected and acceptable to the consumer for domestic or culinary uses.

Dechlorination can be accomplished in individual water systems by the use of activated carbon (dechlorinating) filters. Chemical dechlorination by reducing agents such as sulphur dioxide or sodium thiosulfate can be used for batch dechlorination. Sodium thiosulfate is also used to dechlorinate water samples prior to submission for bacteriological examination.

DISINFECTION EQUIPMENT

Hypochlorinators are the most commonly employed equipment for the chemical elimination of bacteriological contamination. They operate by pumping or injecting a chlorine solution into the water. When properly maintained, hypochlorinators provide a reliable method for applying chlorine to disinfect water.

Types of hypochlorinators include positive displacement feeders, aspirator feeders, suction feeders, and tablet hypochlorinators.

This equipment can be readily adapted to meet the needs of other systems of treatment which require the regulated discharge of a solution into the supply.

Positive Displacement Feeders.—A common type of positive displacement hypochlorinator is one which uses a piston or diaphragm pump to inject the solution. This type of equipment, which is adjustable during operation, can be designed to give reliable and accurate feed rates. When electricity is available, the stopping and starting of the hypochlorinator can be synchronized with the pumping unit. A hypochlorinator of this kind can be used with any water system; however, it is especially desirable in systems where water pressure is low and fluctuating.

Aspirator Feeders.—The aspirator feeder operates on a simple hydraulic principle that employs the use of the vacuum created when water flows either through a venturi tube or perpendicular to a nozzle. The vacuum created draws the chlorine solution from a container into the chlorinator unit where it is mixed with water passing through the unit, and the solution is then injected into the water system. In most cases, the water inlet line to the chlorinator is connected to receive water from the discharge side of the water pump, with the chlorine solution being injected back into the suction side of the same pump. The chlorinator operates only when the pump is operating. Solution flow rate is regulated by means of a control valve; pressure variations are known to cause changes in the feed rate.

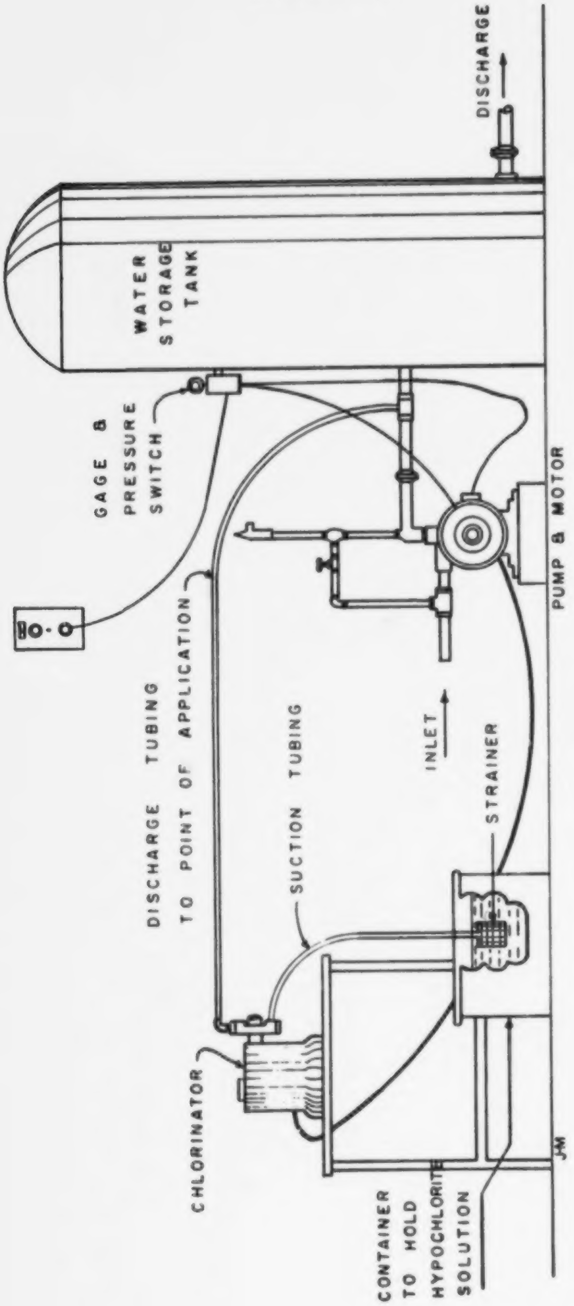
DISCHARGE
WATER STORAGE TANK
GAGE & PRESSURE SWITCH
PUMP & MOTOR
DISCHARGE TUBING TO POINT OF APPLICATION
SUCTION TUBING
INLET
STRAINER
CHLORINATOR
CONTAINER TO HOLD HYPOCHLORIT SOLUTION
J-M

FIGURE 8.—Positive displacement chlorinator.

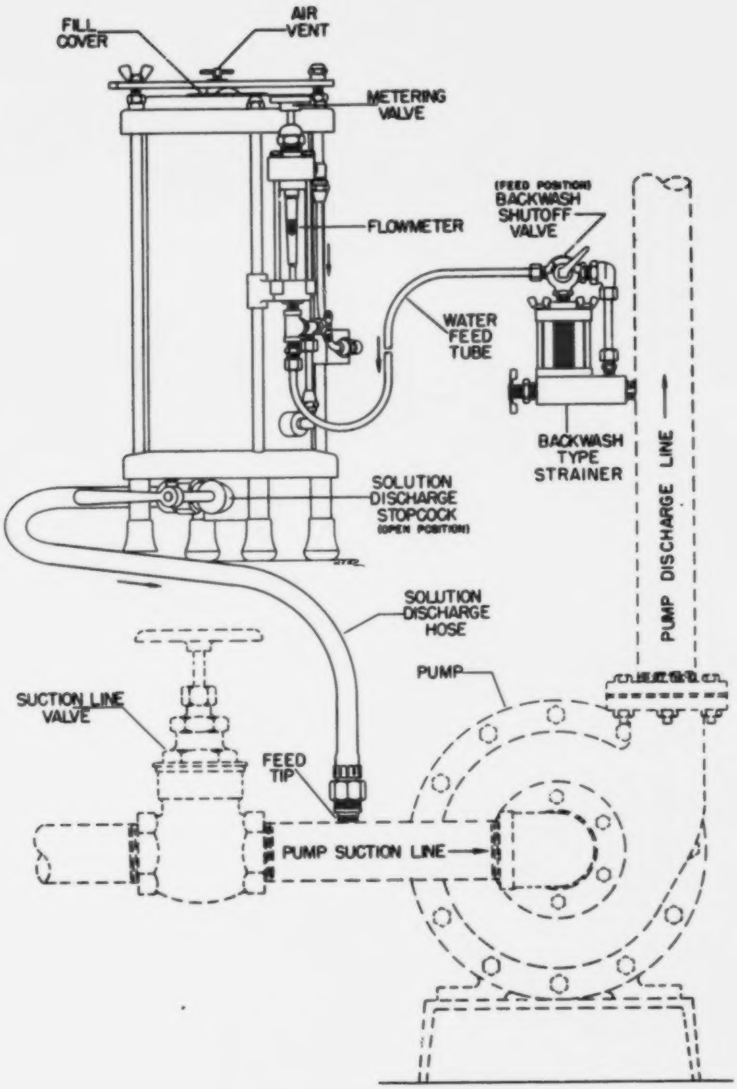
FILL COVER
AIR VENT
METERING VALVE
FLOWMETER
(FEED POSITION) BACKWASH SHUTOFF VALVE
WATER FEED TUBE
BACKWASH TYPE STRAINER
PUMP DISCHARGE LINE
SOLUTION DISCHARGE STOPCOCK (OPEN POSITION)
SOLUTION DISCHARGE HOSE
PUMP
SUCTION LINE VALVE
FEED TIP
PUMP SUCTION LINE

FIGURE 9.—Suction feeder.

Suction Feeders.—One type of suction feeder consists of a single line that runs from the chlorine solution container through the chlorinator unit and connects to the suction side of the pump. The chlorine solution is pulled from the container by suction created by the operating water pump.

Another type of suction feeder operates on the syphon principle, with the chlorine solution being introduced directly into the well. This type also consists of a single line, but the line terminates in the well below the water surface instead of the influent side of the water pump. When the pump is operating, the chlorimator is activated so that a valve is opened and the chlorine solution is passed into the well.

Tablet Hypochlorinator.—These hypochlorinators inject water into a bed of concentrated calcium hypochlorite tablets. The result is metered into the pump suction line.

APPENDIX E. EXAMPLES OF 3-OUT-OF-5 COMPLIANCE ENFORCEMENT PROCEDURES

The following table provides several useful examples of the application of the enforcement system described in Section 6. While the illustrations given relate only to pasteurized milk counts, the method is applied in like fashion to enforcement of established standards for cooling temperature, coliform limits, etc. Pasteurized milk which shows a positive phosphatase reaction and milk in which the presence of antibiotics, pesticides, and other adulterants is discovered shall be dealt with as indicated in Sections 6 and 2, respectively.

Examples of 3-out-of-5 Compliance Enforcement Procedures

[As applied to a standard of 20,000/ml. for pasteurized milk]

Bacteria count per milliliter		Enforcement action
Plant A	Plant B	
6,000	8,000	No action.
11,000	5,000	Do.
12,000	8,000	Do.
22,000	14,000	Do.
23,000	--------	Written notice (Plant A), 2 of last 4 counts exceed required standard. (This notice shall be in effect as long as 2 of the last 4 consecutive samples exceed the standard.) Additional sample required within 14 days.
--------	21,000	No action (Plant B).
9,000	--------	No action (Plant A).
51,000	--------	Suspend permit (Plant A), or require withdrawal of product in violation, since 3 of last 5 counts exceed required standard. Sampling to be initiated upon issuance of temporary permit in accordance with Reinstatement Procedures of Section 3.
--------	4,000	No action (Plant B).
--------	36,000	Written notice (Plant B), 2 of last 4 counts exceed required standard. (This notice shall be in effect as long as 2 of the last 4 consecutive samples exceed the standard.) Additional sample required within 14 days.
		Plant (A) temporary permit issued in accordance with Section 3. Sampling initiated.
11,000	4,000	No action.
3,000	--------	Do.
--------	29,000	Suspend permit (Plant B), or require withdrawal of product in violation since 3 of last 5 counts exceed required standard. Sampling to be initiated upon issuance of temporary permit in accordance with Reinstatement Procedures of Section 3.
22,000	--------	No action.
5,000	--------	Do.
		Plant (B) temporary permit issued in accordance with Section 3. Sampling initiated.
--------	15,000	No action.
--------	10,000	Do.
--------	8,000	Do.
--------	6,000	Do.
--------	3,000	Permit fully reinstated (Plant B).
4,000	--------	Permit fully reinstated (Plant A).

APPENDIX F. SANITIZATION

I. Methods of Sanitization

HEAT

Steam Cabinets.—Cabinets with auxiliary steam boilers shall be provided with vents or valves at the bottom, to permit the discharge of cold air when steam is admitted, and with a drain for the escape of water from condensation.

A suggested procedure for sanitizing with steam is as follows: Store all containers (in an inverted position) and other equipment in the cabinet, taking care that no article is less than 6 inches from the floor. Raise steam to full pressure in the boiler; then admit steam to the cabinet slowly. Steam flow shall be maintained long enough to keep the thermometer reading above 170° F. for at least 15 minutes, or above 200° F. for at least 5 minutes. Allow articles to cool in the cabinet.

In cabinets with steam generated in the bottom, sufficient water may first be heated for washing purposes and drawn off. After being washed, all articles to be treated shall be placed in the cabinet, the cabinet closed, and the remaining water kept boiling for such a period as will keep the thermometer reading above 170° F. for at least 15 minutes, or above 200° F. for at least 5 minutes.

Hot-Air Cabinets.—Hot-air cabinets shall be of sufficient capacity to accommodate the largest piece of equipment. Metal construction is preferred, and the design should provide a 1-inch airspace between the inner and outer walls. The floors shall be provided with a slat platform or other means to permit air circulation. A vent, equipped with a damper or a valve, shall be provided at the top of the cabinet. Installation of a fan in the cabinet will minimize internal temperature differences. An indicating thermometer should be installed in the coldest zone.

All cans, pails, or other equipment shall be stored in the cabinet in an inverted position, and so arranged as to permit air circulation. The 20-minute holding period should begin when the temperature in the coldest zone of the cabinet reaches a minimum of 180° F. as indicated by the thermometer. After treatment, allow articles to cool in the cabinet.

Steam Jets.—Steam jets are sometimes used when the articles to be treated are limited to pails, cans, and strainers. Jets, when properly constructed and operated, will bring the equipment to a considerably higher temperature than is generally true of steam cabinets; and, for this reason, a shorter exposure period of at least 1 minute is satisfactory.

In using the steam jet, care should be taken that each article is kept over the jet for at least 1 minute. When cases of bottles are treated by a steam jet, the steam should emerge from a perforated plate as large as the case, so that it will be uniformly distributed; and the case should be covered with a tight wood hood which will confine the steam.

CHEMICAL

Certain chemical compounds are effective for the sanitization of milk utensils, containers, and equipment. The bactericidal activity of such compounds is influenced by temperature, hydrogen-ion concentration (pH), and, in some instances, by interfering substances in the water in which they are used.

The activity of chemical sanitizers may also be adversely affected by ingredients in washing compounds and organic matter carried over from the wash solution. Consequently, a rinse between washing and bactericidal treatment is important in maintaining the strength of solutions. Similarly, deposits of milk solids on utensil surfaces interfere with bactericidal activity, and chemical sanitizers cannot be relied upon unless the surfaces to be treated are clean.

Temperature, hydrogen-ion concentration and exposure time also influence the corrosive action of the chemical bactericides and sanitizers on materials used for product-contact surfaces of equipment, containers, utensils, and pipelines. Minimum treatment consistent with sanitizing requirements will aid in preserving the sanitary finish of surfaces.

Hypochlorites.—Either calcium or sodium hypochlorite (stock powder or solution) is a satisfactory chemical sanitizer.

An exposure period of at least 1 minute to at least 50 p.p.m. available chlorine should be maintained when the temperature is at least 75° F. Under these conditions, an exposure of 1 minute is considered adequate for all hypochlorites, including the slower, more alkaline compounds. Lower solution temperatures result in slower action; for each 18° F. drop in temperature, approximately double the exposure time is needed to achieve equivalent bactericidal action with the same strength of solution. It is also possible to compensate for lower temperatures by increasing the concentration of the bactericide.

Hypochlorite bactericides cannot be relied upon in the presence of large amounts of milk or other organic matter. A sharp decline in the available chlorine content of a sanitizer following circulation through milk processing equipment is usually regarded as evidence of inadequate cleaning and should be promptly investigated. When a spray is used in lieu of circulation or immersion, the above specified concentrations of available chlorine should be doubled.

Organic Chlorine Compounds.—The bacterial action of chloramine T, the chlorinated hydantoins, the chloramelamines, the chlorinated isocynuriates and other organic forms of chlorine are significantly affected by pH.[a]

For example, with chloramine T solutions, the maximum pH which can be tolerated and still provide satisfactory results at 200 p.p.m. available chlorine is 7.2; at 100 p.p.m. concentration it is 6.8; and at the 50 p.p.m. level, 6.4. Thus, satisfactory results with formulations of the chemical based on the above equivalent germicidal activities cannot be expected with products which ionize in solutions to give pH values higher than 6.4. The practical value of chloramine T is limited to situations where long exposure periods are practicable, or where a low pH can be provided.

Chlorinated hydantoin formulations giving solutions of pH 7.0 and below should be satisfactory.

Satisfactory results in chlorinated isocyanuric acid solutions of pH values up to 9.5 can be expected.

The marked differences found in bactericidal activity of organic chlorine compounds over the pH range illustrate the necessity of establishing the conditions of use, including concentration, from experimental data.

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[a] Ortenzio, L. F., and Stuart, L. S., *The Behavior of Chlorine-Bearing Organic Compounds in the AOAC Available Chlorine Germicidal Equivalent Concentration Test.* Journal of the Association of Official Agricultural Chemists. August 1959.

Quaternary Ammonium Compounds.—Continued field use has established that certain quaternary ammonium compounds are effective bactericides for the treatment of milk utensils, containers, and equipment. The bactericidal effectiveness of specific quaternary ammonium compounds varies and is influenced by the chemical nature and concentration of active agent, temperature, pH, exposure time, and by interfering substances present in natural waters. It has been established that the interference of natural waters is due principally to bicarbonates, sulphates, and chlorides of calcium and magnesium.[b] Ferrous bicarbonate may also interfere to a lesser degree but its interference is minimized when the iron is oxidized. Any treatment which tends to precipitate, remove or inactivate calcium or magnesium reduces this interference as do increased pH and temperature.

Products containing n-alkyl (C_8–C_{18}) dimethyl benzyl ammonium chlorides, n-alkyl (C_{16}–C_{18}) dimethyl benzyl ammonium chlorides, alkyl dimethyl dichlorobenzyl ammonium chlorides and n-alkyl (C_{12}–C_{18}) dimethyl ethylbenzyl ammonium chlorides are effective in waters ranging from 550 to 1,100 p.p.m. hardness without added sequestering agents. Other quaternary products such as diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride and methyl dodecyl benzyl trimethyl ammonium chloride-methyl dodecyl xylene bis (trimethyl ammonium chloride) require compounding with sufficient sodium tripolyphosphate to raise their hard water ceiling levels to a minimum of 500 p.p.m. hardness at use concentrations. By proper formulation, however, levels up to 1,200 p.p.m. are possible. The above products have been found to be bactericidally effective when used (1) at concentrations of 200 p.p.m. or more, (2) at pH levels of 5.0 or higher, (3) at temperatures of 75° F. or higher, and (4) for a 30-second exposure period.

The above-named compounds without sequestering agents are also effective within certain limits of water hardness under the conditions of use enumerated above: however, the level of hardness at which bactericidal activity is reduced below that necessary for effective treatment, varies among the four named compounds and may be influenced by other ingredients in a proprietary formulation. Accordingly, the limiting hardness should be established for the use of each quaternary ammonium product. Unless stated on the label,[c] the health officer should request such information from the manufacturer.

Bacteriological data should be used to establish the usefulness of the above named quaternary ammonium compounds and sequestering agents and any others (1) at temperatures less than 75° F., or (2) at a pH below 6.0, or (3) when combined with a compatible sequestering agent in waters above 500 p.p.m. of hardness, or (4) without, or with less than, the specified amount of sequestering agent. Suggested methods and criteria are given in a following subsection on *Other Chemical Sanitizers*.

Iodine Compounds.—Another type of halogen sanitizer that has been found effective consists of a combination of iodine with certain nonionic substances. Although iodine is only slightly soluble in water and is volatile; in combination with nonionic wetting agents as an iodophor, it is readily soluble in water and is less volatile. When diluted for use, iodophors have a low pH which enhances their germicidal qualities. Increasing the temperatures of a sanitizing solution containing iodophors also increases its effectiveness, but above 120° F. iodine volatilizes, resulting in a decrease in solution strength.

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[b] Chambers, Kabler, Bryant, Chambers, and Ettinger, *Bacterial Efficiency of Q.A.C. in Different Waters*. Public Health Reports, 70 : 545–554. June 1955.

[c] Bactericides shipped interstate are subject to the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act and their labels must be registered with the U.S. Department of Agriculture.

In solution iodophors are yellow or amber in color and the intensity is proportional to the concentration of iodine. Concentrations of 12.5 p.p.m. when used as a bactericide only and 25 p.p.m. when used as a detergent-sanitizer have been found effective. The concentration of iodine can be determined by titration with sodium thiosulfate, and color tests for field use are available. Since the bactericidal properties of different proprietary formulations may vary because of differences in ingredients and pH, their effectiveness may be evaluated by the bacteriological test procedure described in Appendix G, page 134.

Detergent-Sanitizers.—Bactericides are sometimes combined with detergents in proprietary formulations for the cleaning and bactericidal treatment of milk containers, utensils, and equipment in a single operation. Such use has been reported to be effective under certain conditions for the cleaning and bactericidal treatment of dairy farm equipment, milk-transportation tanks, and similar equipment.

The limitations of detergent-sanitizer combinations should be understood if they are to be used effectively. Certain sanitizers and detergents cannot be combined in solution without impairment of bactericidal properties, cleaning properties, or both. In addition, the activity of a detergent-sanitizer is likely to be reduced more rapidly by the presence of milk solids and other organic matter in a combined operation than when bactericidal treatment is a separate process which follows cleaning.

These factors tend to point up the fact that the usefulness of a detergent-sanitizer for the combined cleaning and sanitizing treatment of milk-contact surfaces is dependent on both the composition of the product and its intended use.

"Single-step" operations are actually considered most dependable when the amount of detergent-sanitizer can be carefully proportioned to the exact needs of the equipment involved, assuring effective cleaning and sanitizing, while minimizing the chance of residual chemical deposits on the equipment treated.

Further, and of equal importance to the above, is the need for the protection between treatment and use of all milk contact surfaces so sanitized. The application of untreated rinse water; the handling of equipment, as in the assembly of milking machines on farms or piping systems in milk plants; and the exposure of treated surfaces to airborne contamination through extended storage periods all tend to downgrade the values suggested for detergent-sanitizers.

These precautions are suggested where detergent-sanitizers are used:

1. Equipment to be treated should be thoroughly prerinsed.
2. Solutions should be prepared and used according to manufacturer's directions.
3. Treated equipment which is exposed to any of the hazards of contamination described above should be resanitized prior to use.

Other Chemical Sanitizers.—Bactericides other than those described in the previous sections are also available which are suitable for use on milk equipment. Compounds containing bromine and iodine have been found to be effective for bactericidal treatment. In addition, other types of chemical agents are being compounded into proprietary formulations for the bactericidal treatment of milk equipment; however, their bactericidal effectiveness varies with specific formulations. Such compounds should be safe, and the recommended conditions of usage should provide bactericidal treatment at least equal to that given by 50 p.p.m.

of chlorine as hypochlorite at pH 10.0, at a temperature of 75° F., and with an exposure period of 1 minute.[d]

Sanitizing solutions should be prepared at a concentration such as to provide bacterial effectiveness (for circulation and immersion applications) equivalent to that of hypochlorite solutions at a concentration of 50 p.p.m. of available chlorine.

The bactericidal efficiency of chemical compounds may be evaluated without direct comparison to chlorine. Suitable data may be obtained by use of a bacteriological test procedure such as that proposed by Weber and Black,[e] or the Chambers[f] modification thereof. These tests provide better comparative data at an endpoint somewhat less than total kill of the test cultures. Therefore, the *test time is less* than 1-minute exposure period prescribed in Section 7 of this *Ordinance*. Bactericides which, in recommended concentration, produce a 99.999-percent kill of 75–125 million *E. coli* ATTC 11229 and of 75–125 million *M. pyogenes* var. *aureus* ATCC 6538, within 30 seconds at 70°–75° F., should be considered satisfactory. Swab tests of treated equipment do not furnish sufficient data for this purpose. Valid data can be obtained only when stock cultures and suspensions of the test organisms are prepared in a manner that uniformly maintains their normal level of resistance to germicidal action. Periodic checks to determine the consistency of test results, using a well known chemical such as phenol, is helpful in this regard. The importance of adhering strictly to the composition of mediums and manner of transplanting cultures specified in the test procedures cannot be overemphasized.

II. Sanitization of Assembled Equipment

STEAM

When steam is used, each group of assembled piping shall be treated separately by inserting the steam hose into the inlet and maintaining steam flow from the outlet for at least 5 minutes after the temperature of the drainage at the outlet has reached 200° F. (The period of exposure required here is longer than that required for individual cans, etc., because of the heat lost through the large surface exposed to the air.) Covers must be in place during treatment.

HOT WATER

Hot water may be used by pumping it through the inlet if the temperature at outlet end of the assembly is maintained to at least 170° F. for at least 5 minutes.

CHEMICALS

When chlorine or another chemical solution is used, the solution appearing at the outlet end shall show in excess of the minimum required strength. The chemical solution shall be pumped through the entire equipment for at least 1 minute. Unions and other connectors should be slightly loosened to permit treatment of gaskets and threads, except on lines cleaned-in-place. Surfaces which are not reached by the chemical solution shall be treated with steam as previously described, spray application of chemical solution, or by other acceptable means. Header ends and connecting piping of cabinet coolers should not be overlooked, since condensation from them may enter the collecting trough. Chemical sanitizing solutions should be prepared fresh for each use.

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[d] *Criteria for the Selection of Germicides*, American Journal of Public Health, 51 : 1054–60, July 1961.

[e] American Journal of Public Health, 38 : 1405–17, 1948.

[f] Chambers C. W., *A Procedure for Evaluating the Efficiency of Bactericidal Agents*, Journal of Milk and Food Technology, 19 : 183–187, July 1956.

TREATMENT OF EQUIPMENT OTHER THAN BOTTLES AND PAILS

The treatment of milk cans, coolers, bottling machines, milking machines, other equipment, and all parts thereof, requires special consideration. Large equipment may be treated by thorough swabbing with a bactericidal solution of adequate strength, allowing the solution film to remain at least 1 minute. Rubber milking machine parts can be satisfactorily treated by immersion for 5 minutes in water at a temperature of at least 170° F. They may also be left in a sanitizing solution until the next milking, or treated by filling with or immersing in a 0.5 percent lye solution. Before further use, the lye solution should be drained off and the parts rinsed and sanitized as part of the assembled milking system. Fresh lye solution must be used for each storage period.[6]

III. Sanitizer Strength and Water Hardness Tests

TESTS FOR CHLORINE CONCENTRATION

Three types of field tests are satisfactory for chlorine concentration determinations:

Starch-Iodide Method (iodometric).—This test makes use of the fact that chlorine displaces iodine from potassium iodide in an acid solution (low pH). See general discussions in *Standard Methods for the Examination of Water and Wastewater, Eleventh Edition, American Public Health Association.* Iodine, plus starch, forms a blue color which is removed (decolorized) by the addition of standard sodium thiosulphate. The quantity of standard sodium thiosulphate required to remove the starch-iodine color is a measure of the chlorine present.

Field kits are available which give satisfactorily accurate reading of available chlorine. In some of these kits, the starch and potassium iodide are mixed in dry form for convenience of handling. Some use a liquid acid while others employ, for convenience, a crystalline one, such as sulphamic acid. The sodium thiosulphate is unstable unless a preservative is added. Some test kits make use of a preserved standardized sodium thiosulphate so that one drop of solution is equivalent to 10 p.p.m. of available chlorine. Test kits should be checked periodically against standardized chlorine solutions.

Orthotolidine Colorimetric Comparison.—This test is based on the fact that orthotolidine, which is colorless, forms an orange-brown colored compound when added to chlorine. The depth of color is a measure of the amount of chlorine present. A concentration of 20 p.p.m. of available chlorine causes a precipitate. Consequently, solutions which are concentrated must be diluted, usually at least 1:10 with chlorine-free water. Specific directions and color standards for comparison are included in test kits. Such test kits are available commercially. Color develops more slowly with alkaline hypochlorites than with the less alkaline compounds. Chloramines are considerably slower than alkaline hypochlorites in color formation, usually requiring at least 5 minutes.

Indicator Paper Test.—The indicator paper test is widely used in situations where a high degree of accuracy is not required. It is a convenient, rapid, and generally a useful screening device. Ranges of chlorine concentration are indicated by the color developed on the test paper (usually starch-iodide impregnated) as it is immersed in the solution being tested.

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[6] Jensen, J. M., *Practical Sanitation in Caring for Milking Machines.* Michigan Circular Bulletin No. 218. Michigan State University, East Lansing, Mich. October 1950.

Indicator papers are subject to rather rapid deterioration, especially if they are stored in a damp or chemically adverse environment. Their accuracy also suffers when they are handled excessively, especially if the operator's hands have been exposed to detergents, sanitizers, or other chemically active substances.

TESTS FOR QUATERNARY AMMONIUM COMPOUNDS

Test kits are available which give satisfactory accurate readings within the range of recommended quaternary concentrations.

In some, the reagents are tableted for convenience of handling; others make use of test papers. Where the sanitizing solution is essentially clear and free from organic contamination, the above chemical test procedures will measure the amount of bactericidally active quaternary present during or after use. Where organic contamination is apparent, as evidenced by cloudiness in the sanitizing solution, the test sample should be heated to boiling for at least 5 minutes, and the supernatant liquid made up to volume with water and then removed for testing by pipetting or decantation in order to differentiate between the total amount of quaternary present and the amount bactericidally active.[h] If there is reason to verify the concentration of the stock quaternary solution from which the standardized solutions are made, a laboratory procedure such as that of Furlong and Elliker may be used.[i]

TESTS FOR WATER HARDNESS

The water to be used for preparing solutions should, if pertinent, be within the range of hardness in which the proprietary formulation to be used is effective. Hardness may be determined by either the Hardness by Calculation Method or the Versenate Test (EDTA, titration method, ammonium buffer procedure), as described in *Standard Methods for the Examination of Water and Wastewater*, published by the American Public Health Association.

TESTS FOR HYDROGEN-ION CONCENTRATION

Hydrogen-ion concentration (pH) has a pronounced effect on the activity of sanitizing solutions. Consequently, solutions must be maintained in the pH range within which the bacterial agent is effective. In most cases, the pH of the solution is dependent upon the buffering action of the compound used. The pH of bactericide solutions can best be determined electrometrically, using the glass electrode. However, for a field test, colorimetric methods are more applicable. Two types of test kits for such determinations are available commercially. Colorimetric readings should be made immediately, because of the tendency toward oxidation and decolorization of the indicator. Such indicators as brom thymol blue, cresol red, thymol blue, or others are satisfactory, depending upon the pH range desired.

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[h] Law, McNulty and Rakus *Development of a Procedure for Chemical Assay of the Bacterially Active Ingredient in Quaternary Ammonium Sanitizing Solutions.* Manufacturing Chemist and Aerosol News. November 1964. Lautier Fils Ltd., London.

[i] Journal of Dairy Science, 36 : 225–234, March 1953.

APPENDIX G. CHEMICAL AND BACTERIOLOGICAL TESTS

SINGLE-SERVICE AND MULTIUSE PASTEURIZED MILK AND MILK PRODUCT CONTAINERS—BACTERIOLOGICAL

Reference.—Item 12p.

Application.—To single-service and multiuse pasteurized milk and milk product containers.

Frequency.—At least once each 3-month period.

Criteria.—All multiuse containers shall be effectively subjected to an acceptable bactericidal process, producing containers having a residual bacterial count of not more than 1 per ml. of capacity or not over 50 colonies per 8 square inches (1 per square centimeter), in 3-out-of-4 samples and shall be free of coliform organisms.

All single-service containers shall have, just prior to use, a bacterial count of not more than 1 per ml. of capacity, or not more than 1 colony per square centimeter of surface area in 3-out-of-4 samples, and shall be free of coliform organisms.

Method.—Bacteriological swab and/or rinse counts.

Apparatus and Procedure.—See *Standard Methods for Examination of Dairy Products* for required swab and rinse counts.

PRIVATE WATER SUPPLIES AND RECIRCULATED WATER—BACTERIOLOGICAL

Reference.—Items 8r, 7p, and 17p.

Application.—To private water supplies used by dairy farms, milk plants, receiving stations and transfer stations, and to recirculated cooling water used in milk plants.

Frequency.—Initially, and after repair, modification or disinfection of private water supplies of dairy farms and milk plants and thereafter, semiannually for all milk plant water supplies. Recirculated cooling water in milk plants shall be tested semiannually.

Criteria.—An MPN (Most Probable Number of coliform organisms) of less than 2.2/100 ml., or its membrane filter equivalent.

Apparatus, Method, and Procedure.—See *Standard Methods for Examination of Water and Wastewater.*

Corrective Action.—When the laboratory report on the sample is unsatisfactory, the water supply in question shall again be physically inspected and necessary corrections made until subsequent samples are bacteriologically satisfactory.

PASTEURIZATION EFFICIENCY—FIELD PHOSPHATASE TEST

Reference.—Section 6.

Frequency.—When any laboratory phosphatase test is positive, or any doubt arises as to the adequacy of pasteurization due to noncompliance with equipment, or standards of item 16p.

Criteria.—Less than 1 μg., per ml. by Scharer Rapid Method (or equivalent by other means). See *Standard Methods for the Examination of Dairy Products.*

Apparatus.—Field phosphatase test kit (obtainable from Applied Research Institute, 2 East 23d St., New York 10, N.Y.; standards, extra test tubes, and stoppers, or other approved phosphatase equipment.

Method.—The test is based on the detection of the phosphatase enzyme, a constituent that is inactivated by pasteurization at 145° F. for 30 minutes or 161° F. for 15 seconds. When pasteurization is faulty, some phosphatase remains and is detected through its action on phosphoricphenyl esters, releasing phenol, which is measured quantitatively by the addition of dibromo or dichloroquinonechlorimide to form an indophenol blue color.

Procedure.—See *Standard Methods for Examination of Dairy Products* for details on phosphatase tests.

Corrective Action.—Whenever a phosphatase test is positive, the cause shall be determined. Where the cause is improper pasteurization, it shall be corrected; and any milk or milk products involved shall not be offered for sale.

PHOSPHATASE REACTIVATION IN HTST PASTEURIZED PRODUCTS

The presence of an appreciable quantity of phosphatase in milk and cream after heat treatment has been traditionally regarded as evidence of inadequate pasteurization. However, with the advent of modern high-temperature short-time methods, evidence has been accumulating that under certain conditions, the relationship between inadequate pasteurization and the presence of phosphatase does not hold.

A number of investigators who have studied high-temperature short-time pasteurizing methods have concluded that while a negative test can be obtained immediately after pasteurization, the same sample may yield a positive test after a short period of storage, particularly if the product is not continuously or adequately refrigerated.

This phenomenon has come to be known as reactivation.

Reactivation may occur in HTST pasteurized products after storage at temperatures as low as 50° F. although 93° F. is optimum. Products of high fat content generally produce relatively more reactivatable phosphatase.

Reactivation is greatest in products pasteurized at about 230° F. but may occur in products pasteurized at much higher temperatures and as low as 163° F.

It has been noted that an increase in holding time during pasteurization will reduce reactivation.

The addition of magnesium chloride to HTST processed milk or cream, after pasteurization but before storage, accelerates reactivation. The difference in activity between an adequately pasteurized sample stored with and without magnesium and an inadequately pasteurized sample stored with and without magnesium, forms the basis of a test for differentiating reactivated from residual (inadequately pasteurized) phosphatase.[a]

DETECTION OF ANTIBIOTICS IN MILK

The problem of antibiotics in milk is associated with their use in the treatment of mastitis and other diseases. Failure to withhold milk from the market for sufficient length of time after treatment is responsible for the presence of antibiotics in milk. Such milk is undesirable for two reasons; first, it originates in an unhealthy cow, and second, it is adulterated.

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[a] Campbell, J. E., and McFarren, E. F., *Collaborative Test for Reactivated and Residual Phosphatase in Dairy Products.* Journal of the Association of Official Agricultural Chemists, 44 : 3 August 1961.

The allergenic properties of certain antibiotics in common use make their presence in milk potentially hazardous to consumers. Also, substantial losses of byproducts may be sustained by the milk industry each year because of the inhibitory effects of antibiotics on the culturing process.

DETECTION OF PESTICIDES IN MILK

Any health agency which has adopted this *Ordinance* should operate under a control program which will insure that milk supplies are free from pesticide contamination, in conformance with Definitions R and R–1, Section 1, "Adulterated Milk and Milk Products" and "Misbranded Milk and Milk Products."

Pesticide compounds gain access to milk by various routes. Insecticide contamination may result from any of the following: (1) Application to the cows; (2) inhalation of toxic vapors by the animals following application of insecticides to their environment; (3) ingestion of residues in feed and water; and (4) accidental contamination of milk, feed, and utensils. Herbicide contamination may result from residues on the cows' feed and in their water supply; rodenticides may be present in milk as a result of accidental contamination.

At the present time, chlorinated hydrocarbon pesticides are the chief concern. While there are other pest control compounds which are more toxic than the chlorinated hydrocarbons, many of the agents in this latter group tend to accumulate in the body fat of both cows and human beings, and are secreted in the milk of contaminated cows. The accumulation of these toxic agents in persons continually consuming contaminated milk may reach hazardous concentrations.

Recent advances in residue analyses have resulted in a radical decrease in the use of paper chromatographic screening procedure for milk because of its rather limited sensitivity. Regulatory agencies can now routinely detect residues as low as 0.01 p.p.m. of many of the chlorinated organic pesticides. Satisfactory screening procedures should, therefore, attain this level of sensitivity which usually necessitates the use of gas chromatography or thin layer chromatography.

General screening procedures of the latter two types are described and discussed in Volume 1 of the *Pesticide Analytical Manual* published by the Federal Food and Drug Administration.

The need for closer scrutiny of milk supplies for pesticide residues has stimulated considerable research in detection technology.[b] The health authority entering upon a surveillance program should carefully check the available equipment in relation to its adaptability to the indicated need.

While a schedule of testing comparable to that for microorganisms (four tests of individual producers milk during any consecutive 6 months) would be desirable, broad spectrum procedures are too time consuming to render such a schedule feasible. As a more practical approach, the following procedure is suggested:

(1) Test one load of milk from each tank truck route every 6 months by a broad spectrum method, and trace positive samples, or

(2) Test each producer's milk four times every 6 months for the most common chlorinated hydrocarbon pesticides, by available instrumental methodology.

Note.—The above testing disciplines may be applied conveniently to can milk supplies. Where plan (1) is used, samples of commingled milk from known sources are drawn from receiving station storage tanks. Sampling for plan (2) may be done directly from the weigh tank.

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[b] Schafer, M. L., Bush, K. A., and Campbell, J. E., *Rapid Screening Method for DDT in Milk With Gas Chromatography.* J. Dairy Science, 43 : 1025 (1963).

APPENDIX H. PASTEURIZATION EQUIPMENT AND PROCEDURES

I. HTST Pasteurization

OPERATION OF HTST SYSTEMS

HTST pasteurization has become important to the dairy industry because of the operating efficiencies which it affords. Properly operated, these units allow high volume of production in a minimum of processing space.

The ability of HTST pasteurizers to assure a safe, finished product hinges on the reliability of the time-temperature-pressure relationships which must prevail whenever the system is in operation. It is important that the plant operator understand the HTST process in order to maintain proper surveillance over the equipment. The basic flow pattern is described below:

1. Cold raw milk, in a constant level supply tank, is drawn into the regenerator section of the HTST pasteurizer.

Note.—Some operators prefer to bypass the regenerator when starting. Under this system, cold milk is drawn directly through the timing pump (step 3) and into the heater section. The remaining steps are performed without exception. This bypass arrangement facilitates and speeds up the starting operation. After forward flow is established at the flow-diversion valve, the bypass, which may be manually or automatically controlled, is not used and the raw milk flows through the regenerator. A second start-up technique involves the use of sanitizer solution at 170° F. This is passed through the complete unit and followed immediately by milk. Dilution of the first milk does occur, however, and care must be taken to prevent this from being packaged.

2. In the regenerator section, the cold raw milk is warmed to approximately 135° F. by hot pasteurized milk flowing in a counter current direction on the opposite sides of thin stainless steel surfaces.

3. The raw milk, still under suction, passes through a positive displacement timing pump which delivers it under pressure through the rest of the HTST pasteurization system.

4. The raw milk is pumped through the heater section where hot water or steam on opposite sides of thin stainless steel surfaces heats the milk to a temperature of at least 161° F.

5. The milk, at pasteurization temperature, and under pressure, flows through the holding tube where it is held for at least 15 seconds. (The maximum velocity of the milk through the holding tube is governed by the speed of the timing pump, the diameter and length of the holding tube and surface friction.

6. After passing the sensing bulbs of an indicating thermometer and a recorder-controller, the milk passes into the flow-diversion valve which automatically assumes a forward-flow position if the milk passes the recorder-controller bulb at the preset cut-in temperature (i.e. 161° F. or higher). The valve automatically assumes the diverted-flow position if the milk passes the recorder-controller bulb below the preset cut-out temperature (i.e. 161° F.).

7. Improperly heated milk flows through the diverted-flow line back to the raw milk constant level supply tank.

8. Properly heated milk flows through the forward-flow line to the pasteurized milk regenerator section where it serves to warm the cold raw milk and, in turn, is cooled to approximately 90° F.

9. The warm milk passes through the cooling section, where coolant, on the sides of thin stainless steel surfaces opposite the pasteurized milk, reduces its temperature to 40° F. and below.

10. The cold pasteurized milk then passes to a storage tank or vat to await packaging.

HTST PASTEURIZERS EMPLOYING MILK-TO-MILK REGENERATORS WITH BOTH SIDES CLOSED TO THE ATMOSPHERE

Item 16p (C) of Section 7 establishes standards for regenerators. These standards insure that the raw milk will always be under less pressure than pasteurized milk in order to prevent contamination of the pasteurized milk in the event flaws should develop in the metal or the joints separating it from the raw milk. An explanation of regenerator specifications is given below.

During normal operation (i.e., while the timing pump is operating), raw milk will be drawn through the regenerator at subatmospheric pressure. The pasteurized milk in the milk-to-milk regenerator will be above atmospheric pressure. The required pressure differential will be assured when there is no flow-promoting device downstream from the pasteurized milk side of the regenerator to draw the pasteurized milk through the regenerator, and the pasteurized milk

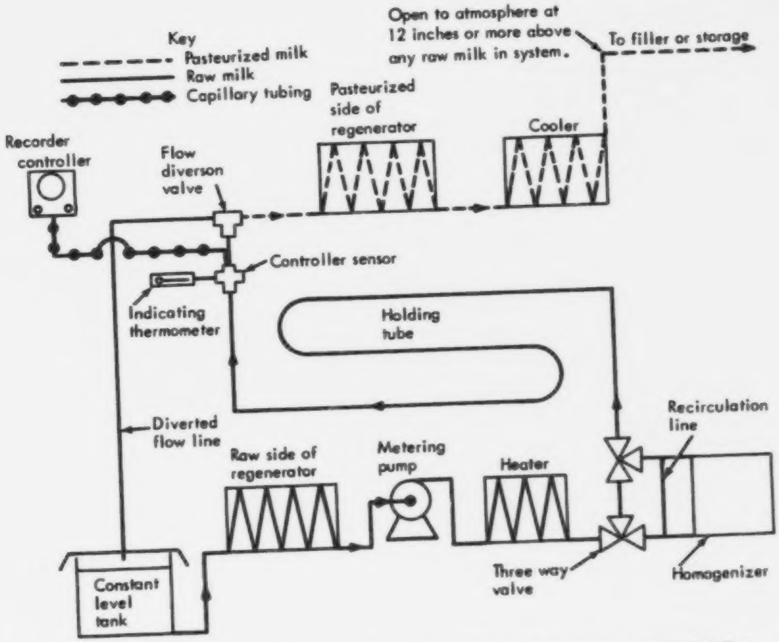
Key
Pasteurized milk
Raw milk
Capillary tubing
Open to atmosphere at 12 inches or more above any raw milk in system.
To filler or storage
Pasteurized side of regenerator
Cooler
Recorder controller
Flow diverson valve
Controller sensor
Indicating thermometer
Holding tube
Diverted flow line
Raw side of regenerator
Metering pump
Heater
Recirculation line
Constant level tank
Three way valve
Homogenizer

FIGURE 10.—Milk-to-milk regeneration—Homogenizer upstream from holder.

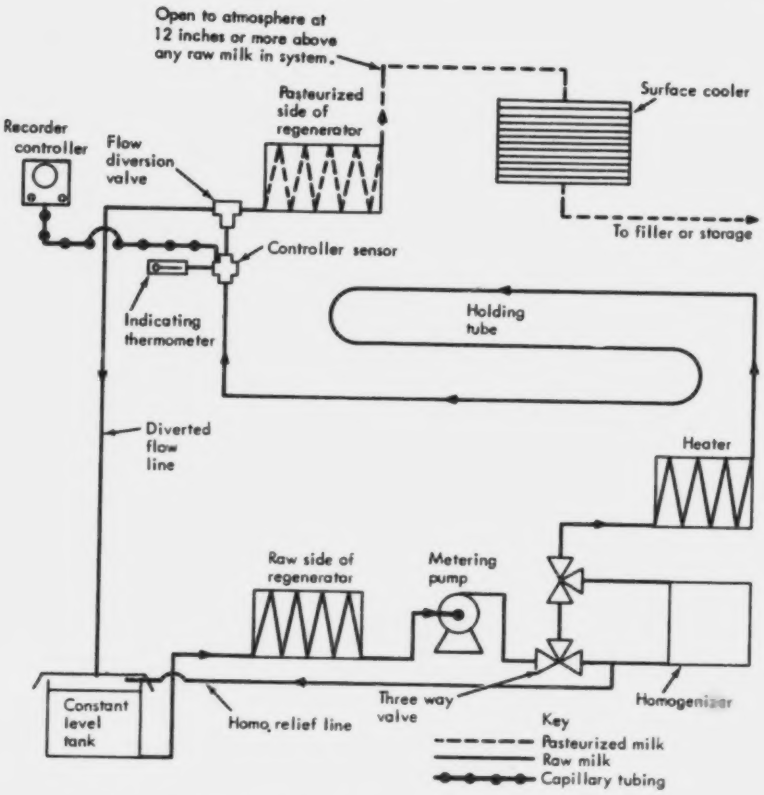
Open to atmosphere at 12 inches or more above any raw milk in system.
Pasteurized side of regenerator
Surface cooler
Recorder controller
Flow diversion valve
Controller sensor
To filler or storage
Indicating thermometer
Holding tube
Diverted flow line
Heater
Raw side of regenerator
Metering pump
Constant level tank
Homo. relief line
Three way valve
Homogenizer
Key
Pasteurized milk
Raw milk
Capillary tubing

FIGURE 11.—Milk-to-milk regeneration—Surface cooler.

downstream from the regenerator rises to at least a 1-foot elevation above the highest raw milk level downstream from the constant-level tank, and is open to the atmosphere at this or a higher elevation, as required in item 16p (C) 2.

During a shutdown (i.e., when the timing pump stops), the raw milk in the regenerator will be retained under suction, except as this suction may be gradually relieved by possible entrance of air drawn through the regenerator plate gaskets from the higher outside atmospheric pressure. With a free draining regenerator, as required under item 16p (C) 7, the raw milk level in the regenerator may drop slowly, depending on the tightness of the gaskets, ultimately falling below the level of the plates to the product level in the raw milk supply tank. However, under these conditions, as long as any raw milk remains in the regenerator, it will be at subatmospheric pressure.

During shutdown, the pasteurized milk in the regenerator is maintained at

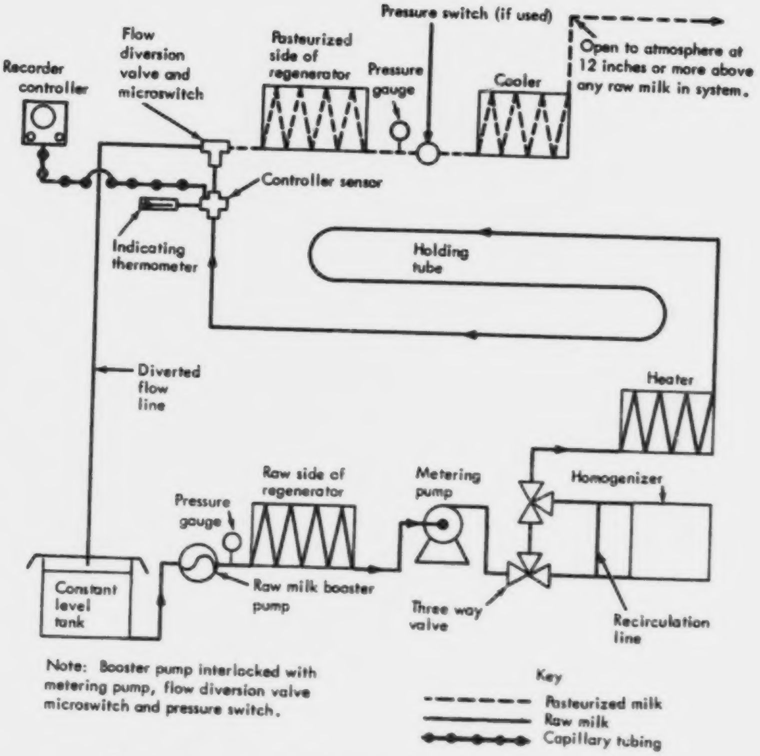
Pressure switch (if used)
Open to atmosphere at 12 inches or more above any raw milk in system.
Recorder controller
Flow diversion valve and microswitch
Pasteurized side of regenerator
Pressure gauge
Cooler
Controller sensor
Indicating thermometer
Holding tube
Diverted flow line
Heater
Raw side of regenerator
Metering pump
Homogenizer
Pressure gauge
Constant level tank
Raw milk booster pump
Three way valve
Recirculation line
Note: Booster pump interlocked with metering pump, flow diversion valve microswitch and pressure switch.
Key
Pasteurized milk
Raw milk
Capillary tubing

FIGURE 12.—Milk-to-milk regeneration—Booster pump.

atmosphere pressure or above by meeting the elevation requirement of item 16p (C) 2. Pressure greater than atmospheric is maintained when the level of pasteurized milk is at or above the required elevation; loss of pressure due to suction is prevented by prohibiting a downstream pump.

Any backflow of milk through the flow-diversion valve would lower the pasteurized milk level during pump shutdowns, thus tending to reduce the pressure on the pasteurized milk side of the regenerator. A flow-diversion valve cannot be relied upon to prevent backflow in such instances, because during the first few minutes following a pump shutdown, the milk is still at a sufficiently high temperature to keep the diversion valve in the forward-flow position. Compliance with the provisions of item 16p (C) 2 and 3, however, will insure a proper pressure differential in the regenerator.

At the beginning of a run, from the time raw milk or water is drawn through the regenerator, until the pasteurized milk or water has risen to the elevation specified in item 16p (C)2, the pasteurized milk side of the regenerator is at atmospheric pressure or higher. Even if the metering pump should stop during this

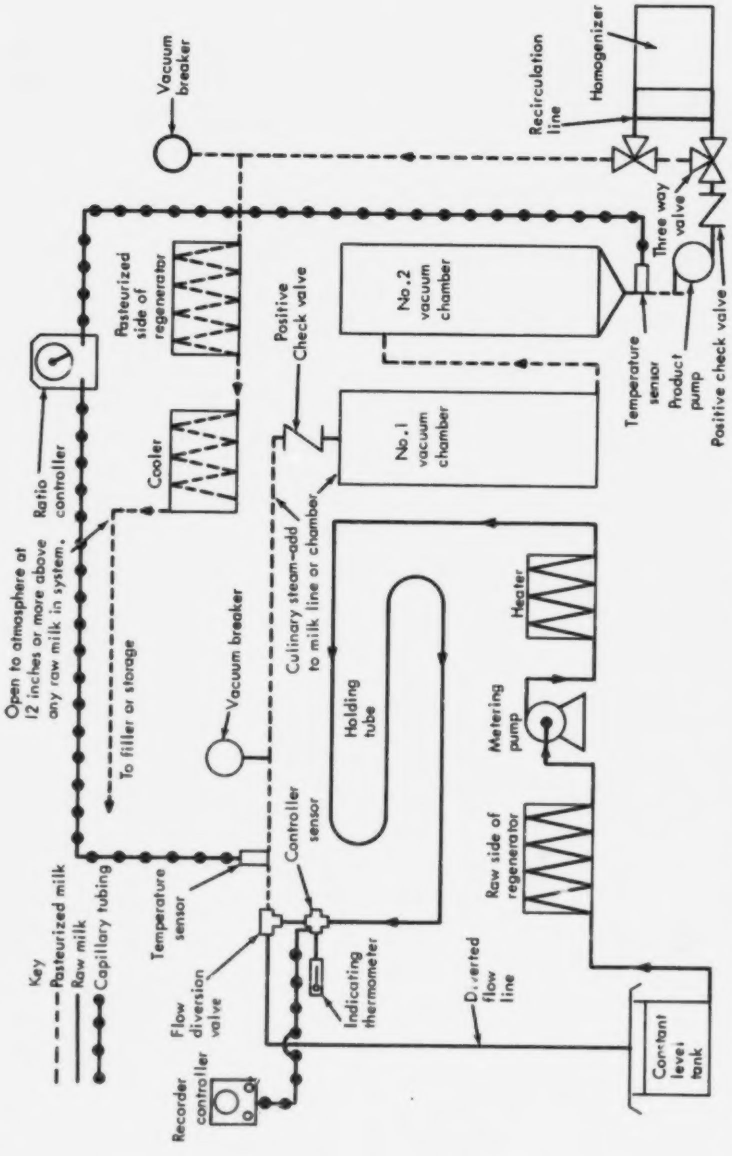
Key
Pasteurized milk
Raw milk
Capillary tubing
Recorder controller
Flow diversion valve
Temperature sensor
Indicating thermometer
Controller sensor
Diverted flow line
Constant level tank
Raw side of regenerator
Metering pump
Heater
Holding tube
Vacuum breaker
To filler or storage
Open to atmosphere at 12 inches or more above any raw milk in system.
Ratio controller
Cooler
Pasteurized side of regenerator
Culinary steam-add to milk line or chamber
Positive Check valve
No. 1 vacuum chamber
No. 2 vacuum chamber
Temperature sensor
Product pump
Positive check valve
Three way valve
Recirculation line
Homogenizer
Vacuum breaker

FIGURE 13.—Milk-to-milk regeneration—Homogenizer and vacuum chambers downstream from flow dispersion valve.

period, the pressure on the pasteurized milk side of the regenerator will be greater than the subatmospheric pressure on the raw milk side, assured by compliance with item 16p (C) 2 and 3, as long as any raw milk remains in the regenerator.

When a raw milk booster pump is incorporated into the HTST system, item 16p (C) 5 requires, in part, that automatic means shall be provided to assure, at all times, the required pressure differential between raw and pasteurized milk in the regenerator before the booster pump can operate. The most common control employed to accomplish this is a sanitary pressure switch installed at or downstream from the pasteurized milk outlet of the regenerator. The pressure switch is adjusted to energize the booster pump only after the pasteurized milk pressure in the regenerator exceeds, by at least one (1) pound per square inch, the maximum operating pressure developed by the booster pump.

The setting and checking of the pressure switch used to control the proper operation of the raw milk booster pump is described in Appendix I, Test 9, page 160.

As an alternative control to the use of the pressure switch, the adjustable time delay relay in conjunction with a hydrostatic head, has been effectively used in HTST systems equipped with raw milk booster pumps of relatively low capacity. Such time delay relay provides a predetermined time lapse between the moment the flow-division valve assumes the forward-flow position and the moment the booster pump is energized. The time lapse required is that necessary for the forward flow of milk through the regenerator and cooler to rise to a height sufficiently above the booster pump outlet to provide a pressure at least one pound greater than the maximum pressure developed by the booster pump. The pasteurized milk pipeline is vented to the atmosphere at or above the necessary vertical rise.

The setting and checking of the time delay relay and hydrostatic head used to control the proper operation of the raw milk booster pump is described in Appendix I, Test 9, page 160.

II. Air Under Pressure—Milk and Milk Contact Surfaces

MATERIAL

Filter Media.—Air intake and pipeline filters shall consist of fiberglass, cotton flannel, wool flannel, spun metal, electrostatic material, or other equally acceptable filtering media, which are nonshedding and which do not release to the air, toxic volatiles, or volatiles which may impart any flavor or odor to the product.

Disposable media filters shall consist of cotton flannel, wool flannel, spun metal, nonwoven fabric, U.S.P. absorbent cotton fiber, or suitable inorganic materials which, under conditions of use, are nontoxic and nonshedding. Chemical bonding material contained in the media shall be nontoxic, nonvolatile, and insoluble under all conditions of use. Disposable media shall not be cleaned and reused.

Filter Performance.—The efficiency of intake filters shall be at least 50 percent as measured by the National Bureau of Standards "Dust Spot Method"[a] using atmospheric dust as the test aerosol.

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[a] Dill, R. S., *A Test Method for Air Filters*. Trans., ASHVE 44 : 379, 1938.

The efficiency of either air pipeline filters or disposable filters shall be at least 50 percent as measured by the DOP (Dioctyl 1-phthalate fog)[b] test.

Piping.—Air distribution piping, fittings, and gaskets between the terminal filter and any product or product-contact surface shall be sanitary milk piping, except where the compressing equipment is of the fan or blower type. When the air is used for such operations as removing containers from mandrels, other nontoxic materials may be used.

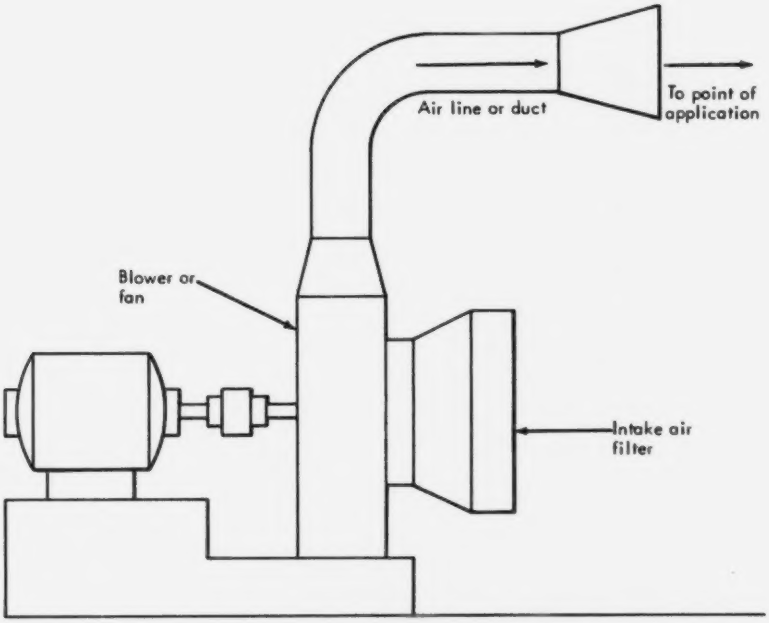

FIGURE 14.—Individual blower-type air supply.

FABRICATION AND INSTALLATION

Air Supply Equipment.—The compressing equipment shall be designed to preclude contamination of the air with lubricant vapors and fumes. Oil-free air may be produced by one of the following methods or their equivalent:

1. Use of a carbon ring piston compressor.
2. Use of oil-lubricated compressor with effective provision for removal of any oil vapor by cooling the compressed air.
3. Water-lubricated or nonlubricated blowers.

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[b] Gucker, F. T., Jr., Pickard, H. B., and O'Konski, C. T., ***Methods of Testing Smoke Filters.*** Handbook on Aerosols, p. 123–136. Atomic Energy Commission, U.S. Government Printing Office, Washington, D.C., 1950.

The air supply shall be taken from a clean space or from relatively clean outer air and shall pass through a filter upstream from the compressing equipment. This filter shall be located and constructed so that it is easily accessible for examination, and the filter media are easily removable for cleaning or replacing. The filter shall be protected from weather, drainage, water, product spillage, and physical damage.

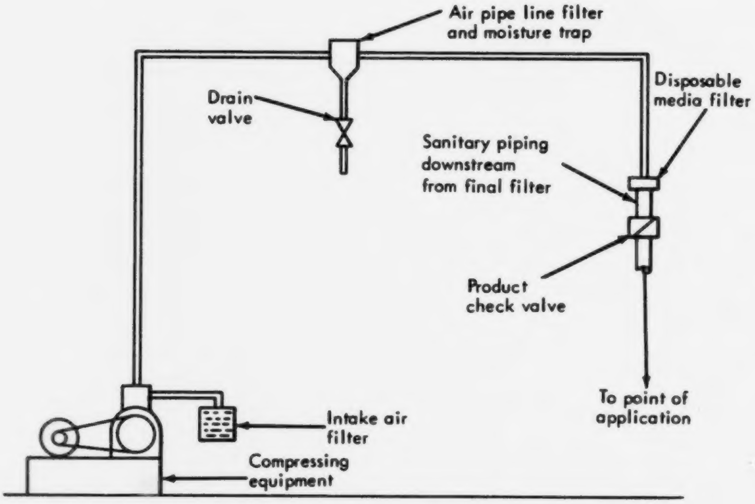
Air pipe line filter and moisture trap
Drain valve
Disposable media filter
Sanitary piping downstream from final filter
Product check valve
To point of application
Intake air filter
Compressing equipment

FIGURE 15.—Individual compression-type air supply.

Moisture Removal Equipment.—If it is necessary to cool the compressed air, an aftercooler shall be installed between the compressor and the air storage tank for the purpose of removing moisture from the compressed air.

Filters and Moisture Traps.—Filters shall be constructed so as to assure effective passage of air through the filter media only.

The air under pressure shall pass through an oil-free filter and moisture trap for removal of solids and liquids. The filter and trap shall be located in the air pipeline downstream from the compressing equipment and from the air tank, if one is used. Air pipeline filters and moisture traps downstream from compressing equipment shall not be required where the compressing equipment is of the fan or blower type.

A disposable media filter shall be located in the sanitary air pipelines upstream from and as close as possible to each point of application or ultimate use of the air.

Air Piping.—The air piping from the compressing equipment to the filter and moisture trap shall be readily drainable.

A product-check valve of sanitary design shall be installed in the air piping downstream from the disposable media filter to prevent backflow of product into the air pipeline, except that a check valve shall not be required if the air piping enters the product zone from a point higher than the product overflow level which is open to the atmosphere.

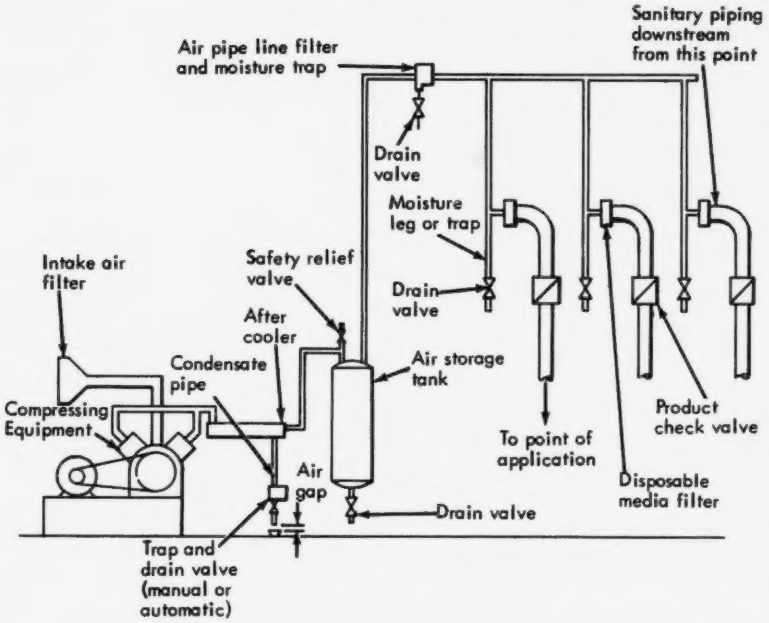
Sanitary piping downstream from this point
Air pipe line filter and moisture trap
Drain valve
Moisture leg or trap
Intake air filter
Safety relief valve
Drain valve
After cooler
Air storage tank
Condensate pipe
Compressing Equipment
Product check valve
To point of application
Air gap
Disposable media filter
Drain valve
Trap and drain valve (manual or automatic)

FIGURE 16.—Central compression-type air supply.

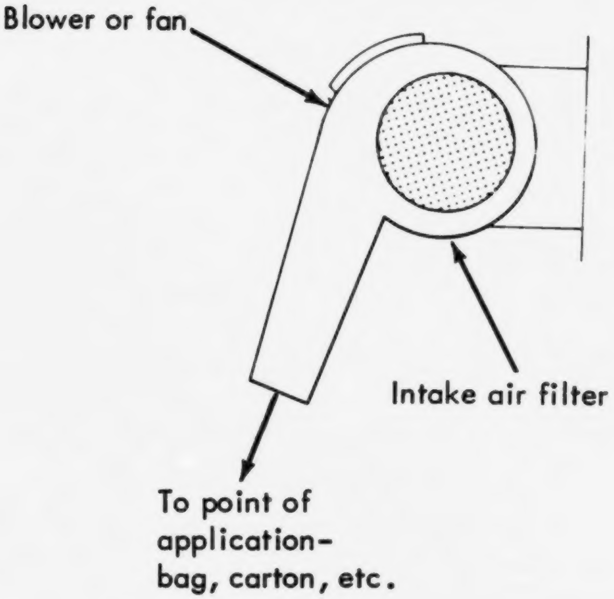
Blower or fan
Intake air filter
To point of application-bag, carton, etc.

FIGURE 17.—Individual fan-type air supply.

The requirements of this section do not apply when the compressing equipment is of the fan or blower type. See illustrations depicting various air supply systems.

Note.—For additional details, see *3–A Accepted Practices for Supplying Air Under Pressure in Contact With Milk, Milk Products, and Product-Contact Surfaces.*

III. Culinary Steam—Milk and Milk Products

The following methods and procedures [c] will provide steam of culinary quality for use in the processing of milk and milk products.

SOURCE OF BOILER FEED WATER

Potable water or water supplies acceptable to the health authority shall be used.

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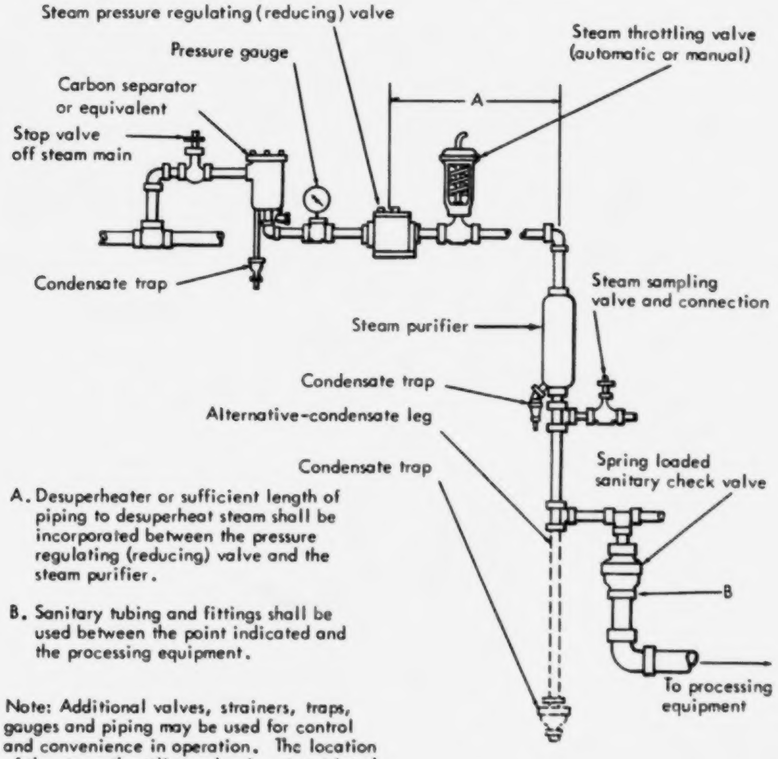
[c] *Recommended Practices for Producing Culinary Steam for Processing Milk and Milk Products*, National Association of Dairy Equipment Manufacturers, 1012 14th St. NW., Washington 5, D.C.


Steam pressure regulating (reducing) valve
Steam throttling valve (automatic or manual)
Pressure gauge
Carbon separator or equivalent
A
Stop valve off steam main
Condensate trap
Steam sampling valve and connection
Steam purifier
Condensate trap
Alternative-condensate leg
Condensate trap
Spring loaded sanitary check valve
B
To processing equipment

A. Desuperheater or sufficient length of piping to desuperheat steam shall be incorporated between the pressure regulating (reducing) valve and the steam purifier.

B. Sanitary tubing and fittings shall be used between the point indicated and the processing equipment.

Note: Additional valves, strainers, traps, gauges and piping may be used for control and convenience in operation. The location of the steam throttling valve is not restricted to the positions indicted on the drawing.

FIGURE 18.—Culinary steam piping assembly for steam infusion or injection.

FEED WATER TREATMENT

Feed waters must be treated, if necessary, for proper boiler care and operation. Boiler feed water treatment and control shall be under the supervision of trained personnel or a firm specializing in industrial water conditioning. Such personnel shall be informed that the steam is to be used for culinary purposes. Pretreatment of feed waters for boilers or steam generating systems to reduce water hardness, before entering the boiler or steam generator by ion exchange or other acceptable procedures, is preferable to addition of conditioning compounds to boiler waters.

The following compounds are used to prevent corrosion and scale in boilers or to facilitate sludge removal:

Ammonium alginate
Cobalt sulfate (as Catalyst)
Lignosulfonic acid
Monobutyl ether of polyoxyethylene glycol.[1]
Monobutyl ether of polyoxypropylene glycol.[1]
Polyoxyethylene glycol [2]
Polyoxypropylene glycol [2]
Potassium carbonate
Sodium humate
Sodium acetate
Sodium alginate
Sodium aluminate
Sodium carbonate
Sodium hexametaphosphate
Sodium hydroxide
Sodium lignosulfonate
Sodium metasilicate
Sodium nitrate
Sodium phosphate (mono-, di-, tri-).
Sodium silicate
Sodium sulfate
Sodium tripolyphosphate
Tannin (including quebracho extract).
Tetrasodium pyrophosphate
Sodium sulfite (neutral or alkaline).

Greater amounts shall not be used of the above boiler water treatment compounds than the minimum necessary for controlling boiler scale or other boiler water treatment purposes. No greater amount of steam shall be used for the treatment and/or pasteurization of milk and milk products than necessary.

It should be noted that Tannin which is also frequently added to boiler water to facilitate sludge removal during boiler blow-down, has been reported to give rise to odor problems, and should be used with caution.

Boiler compounds containing cyclohexylamine, morpholine, octadecylamine, chromium and hydrazine shall not be permitted for use in steam in contact with milk and milk products.

BOILER OPERATION

A supply of clean, dry saturated steam is necessary for proper equipment operation; boilers and steam generation equipment shall be operated in such a manner as to prevent foaming, priming, carryover and excessive entrainment of boiler water into the steam. Carryover of boiler water additives can result in the production of milk off-flavors. Manufacturers' instructions regarding recommended water level and blowdown should be consulted and rigorously followed. The blowdown of the boiler should be carefully watched, so that an overconcentration of the boiler water solids and foaming is avoided. It is recommended that periodic analyses be made of condensate samples. Such samples should be taken from the line between the final steam separating equipment and the point of the introduction of steam into the product.

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[1] Minimum molecular weight 1,500.
[2] Minimum molecular weight 1,000.

PIPING ASSEMBLIES

Suggested piping assemblies for steam infusion or injection are shown on page 146.

Other assemblies which will assure a clean dry saturated steam are acceptable.

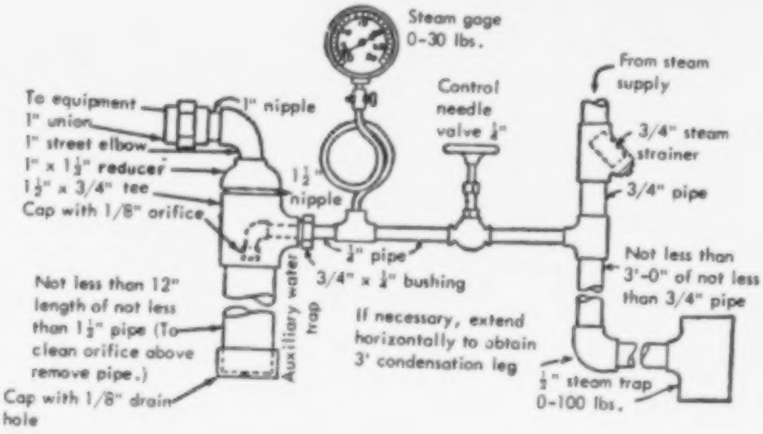
Steam gage 0-30 lbs.
From steam supply
To equipment
1" union
1" street elbow
1" x 1½" reducer
1½" x 3/4" tee
Cap with 1/8" orifice
1" nipple
1½" nipple
Control needle valve ¼"
3/4" steam strainer
3/4" pipe
¼" pipe
3/4" x ¼" bushing
Auxiliary water trap
Not less than 3'-0" of not less than 3/4" pipe
Not less than 12" length of not less than 1½" pipe (To clean orifice above remove pipe.)
If necessary, extend horizontally to obtain 3' condensation leg
Cap with 1/8" drain hole
½" steam trap 0-100 lbs.

FIGURE 19.—Culinary steam piping assembly for airspace heating or defoaming.

IV. Thermometer Specifications

INDICATING THERMOMETERS FOR BATCH PASTEURIZERS

Mercury-actuated; direct-reading; contained in a corrosion-resistant case which protects against breakage and permits easy observation of column and scale; filling above mercury, nitrogen, or other suitable gas.

Magnification of Mercury Column.—To apparent width of not less than one-sixteenth of an inch.

Scale.—Shall have a span of not less than 25° F. including the pasteurization temperature plus and minus 5° F.; graduated in 1° F. divisions with not more than 16° F. per inch of span; protected against damage at 220° F.

Accuracy.—Within 0.5° F., plus or minus through the specified scale span. (App. I, Test 1, p. 154.)

Submerged Stem Fittings.—Pressure-tight seat against inside wall of holder; no threads exposed to milk; location of seat to conform to that of a 3-A Sanitary Standard wall-type fitting or other equivalent sanitary fitting.

Bulb.—Corning normal or equally suitable thermometric glass.

INDICATING THERMOMETERS LOCATED ON PASTEURIZATION PIPE-LINES

Type.—Mercury-actuated; direct-reading; contained in corrosion-resistant case which protects against breakage and permits easy observation of column and scale; filling above mercury, nitrogen, or equally suitable gas.

Magnification of Mercury Column.—To apparent width of not less than one-sixteenth of an inch.

Scale.—Shall have a span of not less than 25° F., including the pasteurization temperature plus and minus 5° F.; graduated in 0.5° F. divisions with not more than 8° F. per inch of scale; protected against damage at 220° F.

Accuracy.—Within 0.5° F., plus or minus throughout specified scale span. (App. I, Test 1, p. 154.)

Stem Fittings.—Pressure-tight seat against inside wall of fittings; no threads exposed to milk; distance from underside of ferrule to top of the sensitive portion of bulb not less than 3 inches.

Thermometric Response.—When the thermometer is at room temperature and then is immersed in a well-stirred water bath 19° F. or less above the pasteurization temperature, the time required for the reading to increase from water bath temperature minus 19° F. to water bath temperature minus 7° F. shall not exceed 4 seconds. (App. I, Test 7, p. 159.)

Bulb.—Corning normal, or equally suitable thermometric glass.

AIRSPACE INDICATING THERMOMETER FOR BATCH PASTEURIZERS

Type.—Mercury-actuated; direct-reading; contained in corrosion-resistant case which protects against breakage and permits easy observation of column and scale; bottom of bulb chamber not less than 2 inches, and not more than 3½ inches, below underside of cover; filling above mercury, nitrogen, or equally suitable gas.

Magnification of Mercury Column.—To apparent width of not less than one-sixteenth of an inch.

Scale.—Shall have a span of not less than 25° F., including 150° F. plus or minus 5° F.; graduated in not more than 2° F. divisions, with not more than 16° F. per inch of scale; protected against damage at 220° F.

Accuracy.—Within 1° F., plus or minus, throughout the specified scale span. (App. I, Test 1, p. 154.)

Stem Fittings.—Pressure-tight seat or other suitable sanitary fittings. No threads exposed.

RECORDING THERMOMETERS FOR BATCH PASTEURIZERS

Case.—Moistureproof under normal operating conditions in pasteurization plants.

Scale.—Shall have a span of not less than 20° F., including pasteurization temperature, plus and minus 5.0° F., graduated in temperature-scale divisions of 1° F. spaced not less than one-sixteenth of one inch apart between 140° F. and 155° F., graduated in time scale divisions of not more than 10 minutes, having a chord or straight-line length of not less than one-quarter inch between 145° F. and 150° F.: *Provided*, That on vats used solely for 30-minute pasteurization of milk products at temperatures above 160° F., 2° F. divisions may be used one-sixteenth of an inch apart, with temperature accuracy 2° F. plus or minus.

Temperature Accuracy.—Within 1° F., plus or minus, between 140° and 155° F. (App. I, Test 2, p. 155.)

Time Accuracy.—The recorded elapsed time, as indicated by the chart rotation, shall not exceed the true elapsed time, as compared to an accurate watch, over a period of at least 30 minutes at pasteurization temperature. Recorders for batch pasteurizers may be equipped with spring operated or electrically operated clocks (App. I, Test 3, p. 156).

Pen-Arm Setting Device.—Easily accessible; simple to adjust.

Pen and Chart Paper.—Pen designed to give line not over one-fortieth of an inch wide; easy to maintain.

Temperature Sensing Device.—Protected against damage at temperature of 220° F.

Submerged Stem Fitting.—Pressure-tight seat against inside wall of holder, no threads exposed to milk or milk products. Distance from underside of ferrule to the sensitive portion of the bulb to be not less than 3 inches.

Chart Speed.—A circular chart shall make one revolution in not more than 12 hours in 1 day. Two charts shall be used if operations extend beyond 12 hours in 1 day. Circular charts shall be graduated for a maximum record of 12 hours. Strip-charts may show a continuous recording over a 24-hour period.

RECORDER CONTROLLERS FOR CONTINUOUS PASTEURIZERS

Case.—Moistureproof under normal operating conditions in pasteurization plants.

Chart Scale.—Shall have a span of not less than 30° F., including the temperature at which diversion is set, plus and minus 12° F., graduated in temperature scale divisions of 1° F. spaced not less than one-sixteenth of one inch apart at the diversion temperature, plus or minus 1.0° F., graduated in time scale divisions of not more than 15 minutes, having an equivalent 15 minute chord or straight-line length of not less than one-fourth inch at the diversion temperature, plus or minus 1.0° F.

Temperature Accuracy.—Within 1° F., plus or minus, at the temperature at which the controller is set to divert, plus or minus 5.0° F. (App. I, Test 2, p. 155).

Power Operated.—All recorder controllers for continuous pasteurization shall be electrically operated.

Pen-Arm Device.—Easily accessible; simple to adjust.

Pen and Chart Paper.—Pen designed to give line not over one-fortieth of an inch wide; easy to maintain.

Temperature Sensing Device.—(Bulb, tube, spring, thermister) protected against damage at temperature of 220° F.

Submerged Stem Fitting.—Pressure-tight seat against inside wall of pipe; no threads exposed to milk or milk products; location from underside of ferrule to the sensitive portion of the bulb not less than 3 inches.

Chart Speed.—A circular chart shall make one revolution in not more than 12 hours in 1 day. Two charts shall be used if operations extend beyond 12 hours in 1 day. Circular charts shall be graduated for a maximum record of 12 hours. Strip-charts may show a continuous recording over a 24-hour period.

Frequency Pen.—The recorder-controller shall be provided with an additional pen-arm for recording, on the outer edge of the chart, the record of the time and temperature at which the flow-control device is in the forward flow, diverted flow, or stopped position. The chart time line shall correspond with the reference arc, and the recording pens shall rest upon the time line matching the reference arc.

Controller.—Cut-in and cut-out response independent of pen-arm movement.

Controller Adjustment.—Mechanism for adjustment of response temperature simple, and so designed that the temperature setting cannot be changed or the controller manipulated without detection by the health authority.

Thermometric Response.—With the recorder-controller bulb at room temperature and then immersed in a well stirred water bath at 7° F. above the cut-in point, the interval between the moment when the recording thermometer reads 12° F. below the cut-in temperature and the moment of power cut-in shall be not more than 5 seconds (App. I, Test 8, p. 159).

INDICATING THERMOMETERS USED IN STORAGE TANKS AND ROOMS

Scale Range.—Shall have a span not less than 50° F. including normal storage temperatures plus or minus 5.0° F. with extension of scale on either side permitted; graduated in not more than 2.0° F. divisions.

Temperature Scale Divisions.—Spaced not less than one-sixteenth of an inch apart between 35° F. and 55° F.

Accuracy.—Within 2° F. plus or minus, throughout the specified scale range.

Stem.—Shall conform to *3–A Sanitary Standards for Thermometer Fittings and Connections* and Supplement No. 1 thereto.

RECORDING THERMOMETERS USED IN STORAGE TANKS

Case.—Moistureproof under operating conditions in processing plants.

Scale.—Shall have a scale span of not less than 50° F., including normal storage temperature plus or minus 5° F., graduated in not less than 2° F. divisions with not more than 40° F. per inch of scale; graduated in time scale divisions of not more than 1 hour having a chord or straight line length of not less than one-eighth of an inch at 40° F. Chart must be capable of recording temperatures up to 180° F. (Span specifications do not apply to extensions beyond 100° F.)

Temperature Accuracy.—Within 2° F. plus or minus, between specified range limits.

Pen-Arm Setting Device.—Easily accessible; simple to adjust.

Pen and Chart Paper.—Designed to give line not over one-fortieth of an inch thick when in proper adjustment; easy to maintain.

Temperature Sensor.—Protected against damage at 212° F.

Stem Fitting.—Shall conform to *3–A Sanitary Standards for Thermometer Fittings and Connections* and Supplement No. 1 thereto.

Chart Speed.—The circular chart shall make one revolution in not more than 7 days and shall be graduated for a maximum record of 7 days. Strip chart shall move not less than 1 inch per hour and may be used continuously for 1 calendar month.

RECORDING THERMOMETERS ON MECHANICAL CLEANING SYSTEMS

Location.—Temperature sensor in the return line downstream from processing equipment and all lines included in the cleaning-in-place process.

Case.—Moistureproof under operating conditions.

Scale.—Shall have a range of 60° F. to 180° F., with extensions of scale on either side permissible; graduated in time-scale divisions of not more than 15 minutes. Above 110° F., the chart is to be graduated in temperature divisions of not more than 2° F. spaced not less than one-sixteenth of an inch apart.

Temperature Accuracy.—Within 2° F. plus or minus, above 110° F.

Pen-Arm Setting Device.—Easily accessible; simple to adjust.

Pen and Chart Paper.—Designed to mark a line not over one-fortieth of an inch wide; easy to maintain.

Temperature Sensor.—Protected against damage at 212° F.

Stem Fitting.—Pressure-tight seat against inside wall of pipe; no threads exposed to solution.

Chart Speed.—Circular charts shall make one revolution in not more than 24 hours. Strip charts shall not move slower than 1 inch per hour. More than one record of the cleaning operation shall not overlap on the same section of the chart for either circular- or strip-type charts.

APPENDIX I. PASTEURIZATION EQUIPMENT AND CONTROLS—TESTS

I. Testing Apparatus Specifications

MAXIMUM-SELF-REGISTERING THERMOMETER

Type.—Maximum-self-registering, mercury actuated; pocket type, readily cleanable.

Magnification of Mercury Column.—To apparent width of not less than one-sixteenth inch.

Scale Range.—140° F. to 150° F., with extension on either side permitted. The 140° F. point to be not less than three-fourths inch above contraction. Protection against damage at 157° F.

Temperature Represented by Smallest Scale Division.—0.2° F.

Number of Degrees per Inch of Scale.—Not more than six.

Accuracy.—Within 0.2° F., plus or minus, between 144° F. and 147° F. The accuracy shall be checked against a thermometer which has been tested for accuracy by the National Bureau of Standards.

Armor.—Thermometer, if armored, to be easily removable for cleaning; armor to be fenestrated; with suspension ring; scale to be visible without removing armor.

Bulb.—Corning normal or equally suitable thermometric glass.

Case.—Metal, provided with fountain pen clip.

The maximum-self-registering test thermometer shall be checked occasionally by holding it in clear water approximately 145° F., reading the temperature while it is immersed, and again 1 minute after the thermometer has been removed from the water bath.

PIPELINE TEST THERMOMETER

Type.—Mercury-actuated; readily cleanable, plain front, enameled back; length, 12 inches; standardized for 4-inch immersion; immersion point to be etched on stem, contraction chamber to be of narrow type, immediately above the bulb, not over 1 inch long; mercury to stand in contraction chamber at 32° F.

Scale Range.—142° F. to 168° F., with extension of scale on either side permitted; 142° F. point to be not less than 1 inch above immersion line. Protected against damage.

Temperature Represented by Smallest Scale Division.—0.2° F.

Number of Degrees per Inch of Scale.—Not more than six.

Accuracy.—Within 0.2° F. plus or minus, throughout specified scale range. The accuracy shall be checked against a thermometer which has been tested for accuracy by the National Bureau of Standards.

Carrying Case.—Felt-lined metal.

Bulb.—Corning normal or equally suitable thermometric glass.

TEST THERMOMETER

Type.—Mercury-actuated; readily cleanable; plain front, enameled back; length 12 inches, immersion point to be etched on stem, mercury to stand in contraction chamber at 32° F.

Scale Range.—175° F. to 205° F., with extension of scale on either side permitted. Protected against damage at 220° F.

Temperature Represented by Smallest Scale Division.—0.2° F.

Number of Degrees per Inch of Scale.—Not more than six.

Accuracy.—Within 0.2° F. plus or minus, throughout specified scale range. The accuracy shall be checked against a thermometer which has been tested by the National Bureau of Standards.

Bulb.—Corning normal or equally suitable thermometric glass.

GENERAL PURPOSE THERMOMETER

Type.—Pocket type; mercury-actuated.

Magnification of Mercury Column.—To apparent width of not less than one-sixteenth inch.

Scale Range.—30° F. to 212° F., with extension on either side permitted. Protected aginst damage at 220° F.

Temperature Represented by Smallest Scale Division.—2° F.

Number of Degrees per Inch of Scale.—Not more than 52.

Accuracy.—Within 2° F. plus or minus, throughout the specified scale range. Checked periodically against a known accurate thermometer.

Case.—Metal, provided with a fountain pen clip.

Bulb.—Corning normal or equally suitable thermometric glass.

ELECTRICAL CONDUCTIVITY MEASURING DEVICES

Type.—Wheatstone bridge, Galvanometer, Milliammeter; manual or automatic.

Conductivity.—Capable of detecting change produced by the addition of 10 parts per million of sodium chloride, in water of 100 parts per million of hardness.

Electrodes.—Standard.

Automatic Instruments.—Electric clock, time divisions not less than two-tenths of 1 second.

STOPWATCH

Type.—Pocket type, open face, hand indicating fractional seconds.

Accuracy.—Accurate to one-fifth of a second.

Hands.—Sweep hand, one complete turn every 60 seconds or less.

Scale.—Divisions of not over two-tenths of a second.

Crown.—Depression of crown starts, stops, and resets to zero.

II. Test Procedures

Equipment and field tests to be performed and samples to be taken by the health authority are listed and suitably referenced below. The results of tests shall be recorded on "Milk Plant Equipment Test Form," (PHS-723-2), or equivalent, and results filed in the office's permanent record.

TEST 1. INDICATING THERMOMETERS—TEMPERATURE ACCURACY

Reference.—Item 16p(D).

Application.—To all indicating thermometers used for measurement of milk temperature during pasteurization, including airspace thermometers.

Frequency.—Upon installation and once each 3 months thereafter.

Criteria.—Within 0.5° F. plus or minus, in a specified scale range.

Apparatus.—(a) Test thermometer meeting specifications under Appendix I.

(b) Water bath and agitator.

(c) Suitable means of heating water bath.

Method.—Both thermometers exposed to a water medium of uniform temperature. Indicating thermometer reading is compared to the reading of the test thermometer.

Procedure.—(a) Prepare 10 gallons of water in a milk can or vat by raising the temperature of the water to within a range of 3° F. of the appropriate pasteurization temperature or airspace temperature.

(b) Remove heat source; agitate water bath rapidly.

(c) Continue agitation. Insert indicating test thermometer to indicated immersion point during the test.

(d) Compare both thermometer readings at the temperature reading within the test range.

(e) Repeat comparison of readings.

(f) Record thermometer readings, thermometer identification, or location.

Corrective Action.—Do not run test if mercury column has been split or capillary tube is broken as thermometer should be returned to the factory for repair. When the indicating thermometer differs from the test thermometer by more than 0.5° F., the scale plate of the indicating thermometer should be adjusted to agree with the test thermometer. Retest the thermometer after adjustment.

TEST 2. RECORDING THERMOMETERS—TEMPERATURE ACCURACY

Reference.—Item 16p(D).

Application.—To all recording and recorder-controller thermometers used to record milk temperatures during pasteurization.

Frequency.—Upon installation, at least once each 3 months and whenever recording pen-arm setting requires frequent adjustment.

Criteria.—Within 1° F. plus or minus, in specified scale range.

Apparatus.—Pasteurizer indicating thermometer previously tested against a known accurate thermometer, two 10-gallon milk cans, or suitable vats or containers, agitator, suitable means of heating water baths and ice.

Method.—The testing of a recording thermometer for temperature accuracy involves the determination of whether or not the temperature pen-arm will return to within 1° F. of its previous setting after exposure to boiling water and melting ice.

Procedure.—(a) Adjust the recording pen to read exactly as the previously tested indicating thermometer in the temperature range for the pasteurization process being used after a stabilization period of 5 minutes at a constant temperature. The water bath shall be rapidly agitated throughout the stabilization period.

(b) Prepare one water bath by heating to the boiling point. Maintain temperature. Prepare a second container with melting ice. Place water baths within working distance of the recorder sensing element.

(c) Immerse the sensing element of recorder in boiling water for not less than 5 minutes.

(d) Remove the sensing element from the boiling water and immerse in melting ice for not less than 5 minutes.

(e) Have a can of water adjusted to a temperature within the testing range for the pasteurization process being used. Allow a 5-minute stabilization period for both indicating and recording thermometers. Compare readings of 1° F. plus or minus, indicator thermometer reading.

(f) Record results.

Corrective Action.—If the pen does not return to 1° F. plus or minus of indicating thermometer reading, the recording thermometer should be repaired.

TEST 3. RECORDING THERMOMETERS—TIME ACCURACY

Reference.—Item 16p(D).

Application.—To all recording and recording-controller thermometers used to record time of pasteurization.

Frequency.—Upon installation and at least once each 3 months thereafter.

Criteria.—The recorded time of pasteurization shall not exceed the true elapsed time.

Apparatus.—(a) A watch graduated at intervals not to exceed 1 minute, and accurate to within 5 minutes in 24 hours.

(b) A pair of dividers, or any other suitable device for measuring short distances.

Method.—Comparison of the recorded time over a period of not less than 30 minutes with a watch of known accuracy. For recorders utilizing electric clocks, check cycle on face plate of clock with known cycle; observe that clock is in operating condition.

Procedure.—(a) Determine if chart is appropriate to recorder.

(b) Inscribe reference mark at the pen point on the recorder chart at the start of the holding period and record the time.

(c) At the end of 30 minutes by the watch, inscribe a second reference mark at the pen point position on the chart.

(d) Determine the distance between the two reference marks and compare the distance with the time-scale divisions on the record chart at the same temperature.

(e) For electric clocks, remove face plate, compare cycle specification on face plate with the current cycle utilized.

(f) Enter finding on chart and initial. Record results.

Corrective Action.—If recorded time is incorrect, the clock should be adjusted or repaired.

TEST 4. RECORDING THERMOMETERS—CHECK AGAINST INDICATING THERMOMETER

Reference.—Item 16p(D).

Application.—To all recording thermometers used to record milk temperatures during pasteurization.

Frequency.—At least once each 3 months by health authority; daily by plant operator.

Criteria.—Recording thermometer shall not read higher than corresponding indicating thermometer.

Apparatus.—No supplementary materials required.

Method.—This test requires only that the reading of the recording thermometer be compared with that of the indicating thermometer at a time when both are exposed to milk at a stabilized pasteurization temperature.

Procedure.—(a) While milk is at a stabilized pasteurization temperature, read indicating thermometer.

(b) Immediately inscribe on the recording-thermometer chart a line intersecting the recorded temperature arc at the pen location; record on the chart the indicating thermometer temperature; initial.

(c) Record results.

Corrective Action.—If recording thermometer should read higher than indicating thermometer, the pen should be adjusted by the operator.

TEST 5. FLOW DIVERSION VALVE—PROPER ASSEMBLY AND FUNCTION

Reference.—Item 16p(D).

Application.—To all flow diversion valves used with continuous-flow pasteurizers.

Frequency.—Upon installation and at least once each 3 months thereafter.

Criteria.—The flow diversion valve shall function correctly in operating situations and shall de-energize the metering pump in the event of malfunction or incorrect assembly.

A. LEAKAGE PAST VALVE SEAT

Apparatus.—Open end wrench for sanitary fitting.

Method.—Observe the valve seat of the flow-diversion valve for leakage.

Procedure.—With the HTST system operating with water, place the flow-diversion valve in diverted flow position. Disconnect the forward flow piping; observe the valve seat for leakage.

Corrective Action.—If leakage is noted, valve must be dismantled and defective gaskets replaced or other suitable repairs made.

B. OPERATION OF VALVE STEM

Apparatus.—Open end or adjustable wrench.

Method.—Observe flow-diversion valve stem for ease of movement.

Procedure.—Tighten stem packing nut as much as possible. Operate HTST system; place valve in forward and diverted flow several times. Note freedom of action of valve stem.

Corrective Action.—If valve action is sluggish, suitable adjustment or repair shall be made to permit stem to act freely in all positions with packing nut fully tightened.

C. VALVE ASSEMBLY

Apparatus.—Open end wrench for sanitary fittings.

Method.—Observe function of metering pump when flow-diversion valve is improperly assembled.

Procedure.—(a) With HTST system in operation, unscrew by one-half turn, the 13H hex nut which holds the top of the valve to the valve body. This should de-energize the metering pump. This test should be run with no piping connected to the forward flow port of the valve since there can be sufficient force from the piping to keep the forward flow port tightly clamped even though the hex nut is loosened.

(b) With the HTST system in operation and the flow-diversion valve in the diverted position, remove the connecting key located at the base of the valve stem. The metering pump should be de-energized.

Corrective Action.—If metering pump fails to respond as indicated, an immediate check of the valve assembly and wiring are required to locate and correct the cause.

D. MANUAL DIVERSION (when booster pump is installed in the HTST system)

Apparatus.—None.

Method.—Observe the response of the system to manual diversion.

Procedure.—With the HTST system in operation and the flow-diversion valve in the forward flow position, press the manual diversion button located on the valve bonnet cover plate. This should (a) cause the valve to assume the divert position, and (b) de-energize the booster pump; the pressure differential between raw and pasteurized milk in the regenerator should be maintained.

Corrective Action.—If (a) and (b) above do not occur as described or the necessary pressure differential between raw and pasteurized milk is not maintained, the assembly and wiring of the HTST system must be immediately reviewed and the indicated deficiencies corrected.

E. RESPONSE TIME

Apparatus.—Stopwatch. The stopwatch should be used to determine that the response time interval does not exceed 1 second.

Method.—Determine the elapsed time between the instant of the activation of the control mechanism at cut-out temperature on declining temperature and the instant the flow-diversion valve takes the fully diverted flow position.

Procedure.—(a) With water bath at a temperature above cut-out temperature, allow the water to cool gradually. At the moment the cut-out mechanism is activated, start the watch and the moment the flow-diversion valve takes the fully diverted position, stop the watch.

(b) Record results.

Corrective Action.—Should response time exceed 1 second, immediate corrective action must be taken.

TEST 6. LEAK PROTECTOR VALVE

Reference.—Item 16p(D).

Application.—To all pasteurizer inlet, outlet, and flow-diversion valves required to be of the leak-protector type.

Frequency.—Upon installation and at least once each 3 months thereafter.

Criteria.—No leakage of milk past the valve seat in any closed position.

Apparatus.—No supplementary materials required.

Method.—By observing when the piping is disconnected from the valve outlet whether or not leakage past the valve seat occurs when milk pressure is exerted against the upstream face of the valve.

Procedure.—(a) During normal operation, while milk pressure is exerted against the valve inlet, fully close the valve and disconnect the outlet piping. In the case of flow-diversion valves, this should be done during diversion.

(Caution: Care must be taken to avoid contamination of the valves or the piping.)

(b) Observe whether or not any milk is leaking past the valve seat into the valve outlet.

(c) In the case of plug-type valves, turn the valve to the just-closed position, and examine for leakage into the valve outlet.

(d) Reconnect the outlet piping.

(e) Record identity of the valve, and findings, for office record.

Corrective Action.—If leakage past the valve seat should occur in any closed position, the valve plug should be reground, gaskets replaced, springs replaced or other necessary steps be taken to prevent leakage.

TESTS 7. INDICATING THERMOMETERS ON PIPELINES—THERMOMETRIC RESPONSE

Reference.—Item 16p(D).

Application.—To all indicating thermometers located on pipelines and used for determination of milk temperatures during pasteurization.

Frequency.—Upon installation and once each 3 months thereafter.

Criteria.—Four seconds under specified conditions.

Apparatus.—Pipeline test thermometer, stopwatch, water bath (10-gallon can), agitator, heat supply, and indicating thermometer from pasteurizer.

Method.—By measuring the time required for the reading of the thermometer being tested to increase 12° F. through a specified temperature range (temperature range must include pasteurization temperature). The temperature used in the water bath will depend upon the scale range of the thermometer to be tested.

Procedure.—(a) Immerse indicating thermometer in water bath heated to a temperature at least 19° F. higher than minimum scale reading on indicating thermometer. Bath temperature should be higher than maximum pasteurization temperature for which thermometer is used.

(b) Immerse indicating thermometer in bucket of cold water for several seconds to cool it.

Note.—Continuous agitation of water baths during the performance of steps (c), (d), and (e) is required. Elapsed time between end of step (a) and beginning of step (c) should not exceed 15 seconds so hot water bath does not cool significantly.

(c) Insert indicating thermometer in hot water bath to proper bulb immersion depth.

(d) Start stopwatch when indicating thermometer reads 19° F. below bath temperature.

(e) Stop stopwatch when indicating thermometer reads 7° F. below bath temperature.

(f) Record thermometric response time for office record.

Example.—On a thermometer with a range of 150° to 175° F. used at a pasteurization temperature of 161° and 166° F., a water bath of 170° F. could be used. 19° F. below 170° F. would be 151° F.; 7° F. below 170° F. would be 163° F. Hence after immersing the thermometer, which had been previously cooled, in the 170° F. bath, the stopwatch is started when the thermometer reads 151° F. and stopped when it reads 163° F.

Note.—The test included the pasteurization temperature of 161° and 166° F.

Corrective Action.—If the response time should exceed 4 seconds, the thermometer should be replaced or returned for repair.

TEST 8. RECORDER-CONTROLLER—THERMOMETER

Reference.—Item 16p(B).

Application.—To all recorder-controllers used in connection with continuous flow pasteurizers.

Frequency.—Upon installation and at least once each 3 months thereafter.

Criteria.—Five seconds, under specified conditions.

Apparatus.—Previously tested indicating thermometer (on pasteurizers), stopwatch, water bath (10-gallon milk can), agitator, heat supply.

Method.—Measure the time interval between the instant when the recording thermometer reads 12° F. below the cut-in temperature and the moment of cut-in by the controller. This measurement is made when the sensing element is immersed in a rapidly agitated water bath maintained at exactly 7° F. above the cut-in temperature.

Procedure.—(a) Check and, if necessary, adjust the pen-arm setting of the recording thermometer in the proper reference arc to agree with the indicating thermometer reading at pasteurization temperature.

(b) Determine the cut-in temperature of controller (Test No. 10, page 162), either while in normal operation or by using a water bath.

(c) Remove sensing element and allow to cool to room temperature.

(d) Heat water bath to exactly 7° F. above the cut-in temperature while vigorously agitating water bath to insure uniform temperature.

(e) Immerse recorder-controller bulb in water bath. Continue agitation during items (f) and (g) below.

(f) Start stopwatch when the recording thermometer reaches a temperature of 12° F. below the cut-in temperature.

(g) Stop stopwatch when the controller cuts in.

(h) Record thermometric response time for office record.

Corrective Action.—If the response should exceed 5 seconds, the recorder-controller should be repaired.

TEST 9 SETTING OF CONTROL SWITCHES—REGENERATOR PRESSURE

Reference.—Item 16p(D).

A. PRESSURE SWITCHES—Used to control operation of booster pumps

Application.—To all pressure switches controlling the operation of booster pumps on HTST pasteurizer systems employing regenerators.

Frequency.—Upon installation, each 3 months thereafter, after any change in the booster pump or the switch circuit, and/or whenever the pressure switch seal is broken.

Criteria.—The pump shall not operate unless there is at least a 1-pound pressure differential on the pasteurized milk side of the regenerator.

Apparatus.—Sanitary pressure gage and pneumatic testing device, for checking and adjusting pressure switch settings.

A simple inexpensive pneumatic testing device may be made from a discarded 2″–7BX sanitary tee, with two additional 13H nuts, one of which is provided with a 16A cap, drilled and tapped for a one-half inch galvanized iron nipple for the air connection. A hose connection is made to a compressed air source in the plant by means of a snap-on fitting. The air pressure can be controlled by an inexpensive pressure reducing valve (range 0–60 p.s.i.g.) followed by a ½-inch globe type bleeder valve connected into the side outlet of a ½-inch tee installed between the pressure reducing valve and the testing device. The pressure switch to be tested is disconnected from the pasteurizer and connected to another of the outlets of the sanitary tee, and the pressure gage is connected to the third outlet of the sanitary tee. By careful manipulation of the air pressure reducing valve and the air bleeder valve, the air pressure in the testing device may be regulated slowly and precisely. (In operating the device, care should be taken to avoid exposing the pressure switch and the sanitary pressure gage to excessive pressure which might damage them. This can be done by first closing off the air pressure regulating valve and opening fully the bleeder valve; these may then be manipulated slowly to bring the air pressure in the testing device within the desired range.) A test light of proper voltage can be placed in series with the pressure switch contact and in parallel with the electrical load (booster pump starter) so the actuation point may be readily determined. (This testing device is similar to that described in an article *A Simple Pneumatic Tester for Checking and Setting Pressure Switches for HTST Booster Pump Control*, Tom W. Proctor, Journal of Milk and Food Technology, vol. 24, No. 10, October 1961.)

Method.—Check and make adjustment of pressure switch so as to prevent the operation of the booster pump unless the pressure on the pasteurized milk side of the regenerator is greater by at least 1 pound per square inch than any pressure that may be generated on the raw side.

Procedure

1. Determine maximum pressure of booster pump.

(a) Install sanitary pressure gage in tee at discharge of booster pump.

(b) Operate the pasteurizer with water, with the flow-diversion valve in forward-flow position, the metering pump operating at minimum speed possible, and the booster pump operating at its rated speed. If vacuum equipment is located between the raw outlet from the regenerator and the metering pump, it should be bypassed while this determination is made.

(c) Note maximum pressure indicated by pressure gage under these conditions.

2. Check and set the pressure switch.

(a) Install a sanitary pressure gage of known accuracy on the pneumatic testing device to which the pressure switch sensing element should also be connected.

(b) Remove the seal and cover to expose adjustment mechanism on pressure switch.

(c) Operate the testing device and determine the pressure gage reading at the cut-in point of the pressure switch which will light the test lamp. (If the switch is short circuited, the lamp will be lighted before air pressure is applied.)

(d) The cut-in point should be adjusted, if necessary, so as to occur at a pressure gage reading at least 1 pound per square inch greater than the maximum booster pump operating pressure, as determined under (1) preceding. Where adjustment is necessary, refer to manufacturer's instructions for adjusting procedure. After adjustment, recheck actuation point and readjust if necessary.

(e) Replace cover and seal the pressure switch and restore sensing element to original location.

(f) Record test results for the office record.

B. TIME DELAY SWITCHES—Used to control operation of booster pumps

Application.—To all time-delay switches controlling operation of booster pumps.

Frequency.—Upon installation, after any change in the pump or relay circuit and whenever seal is broken.

Criteria.—The booster pump shall not operate until the pasteurized milk has achieved a pressure at least 1 pound greater than the maximum pressure developed by the booster pump.

Apparatus.—Accurate stopwatch, graduated at intervals not to exceed 0.2 of 1 second, pressure gage or manometer.

Method.—Reference: Dashiell, W. N., *Use of Time Delay Relay To Control Booster Pump Operation*. Journal of Milk and Food Technology, 21:7. July 1958.

Procedure.—(a) Operate pasteurizers with water with the flow-diversion valve in forward-flow position, metering pump operating at minimum speed, booster pump at rated speed. Vacuum equipment not operating or bypassed.

(b) Determine the maximum pressure developed at the discharge of the booster pump. Following the determination of the height of the liquid level, add at least 3 feet to provide the 1-pound pressure differential equivalent of 0.7 feet of water column to compensate for difference in the specific gravity between water at 161° F. and raw milk at 40° F. The pasteurized liquid level must rise to the computed elevation, above the outlet level of the booster pump and be vented to the atmosphere at this or higher level.

(c) Time the interval from the moment the forward flow is established until the pasteurized liquid level rises to the required elevation. The time measurement shall be made at the beginning of a run when on water is in the pasteurized product line. The booster pump shall not be operating.

(d) The time delay relay shall be installed in the circuit, interlocked with the metering pump, forward-flow of the flow-diversion valve and the booster pump. Adjust the time delay setting to provide the time interval. Check the setting several times. Seal the time delay relay.

(e) Record for permanent office record.

Corrective Action.—Adjust pasteurized milk pipe to proper elevation. If time delay relay is not accurate, return for repair.

C. PRESSURE GAGES—Used with booster pump operations

Application.—To all required pressure gages used to measure relative raw milk and pasteurized milk pressure in HTST regenerators.

Frequency.—Upon installation, each 3 months thereafter, and whenever the gages are adjusted or repaired.

Criteria.—Required pressure gages shall be accurate.

Apparatus.—Identical testing device used to check proper operation of pressure switch (Test 9, (A), p. 160).

A pressure gage of known accuracy is connected to one outlet of the test apparatus. The gage being checked is connected to the second outlet of the sanitary tee. Air is bled into the system through the third outlet and comparative readings made. Record test results for office record.

Corrective Action.—Inaccurate gages should be returned to the factory for repair. It is not recommended that the plant operator attempt the adjustment of pressure gages.

TEST 10. MILK-FLOW CONTROLS—MILK TEMPERATURES AT CUT-IN AND CUT-OUT

References.—Item 16p(B), 16p(D).

Application.—To all recorder-controllers used in connection with continuous flow pasteurizers.

Frequency.—Upon installation and quarterly by the health authority; daily by the plant operator.

Criteria.—No forward flow unit pasteurization temperature has been reached. Flow diverted before temperature drops below minimum pasteurization temperature.

Apparatus.—No supplemental materials needed.

Method.—By observing the actual temperature of the indicating thermometer at the instant forward flow starts (cut-in) and stops (cut-out).

Procedure.—(a) Cut-in temperature.

(1) While milk or water is completely flooding the sensing element of the record-controller and the indicating thermometer, increase the heat gradually so as to raise the temperature of the water or milk at a rate not exceeding 1° F. every 30 seconds.

(2) Observe the indicating thermometer reading at the moment the forward flow starts (i.e., flow-diversion valve moves). Observe that the frequency pen reading is syncronized with the recording pen on the same reference arc.

(3) Record the indicating thermometer reading on the recorder chart; inscribe initials. The health authority shall record test findings.

(b) Cut-out temperature.

(1) After the cut-in temperature has been determined and while the milk or water is above the cut-in temperature, allow the water to cool slowly at a rate not exceeding 1° F. per 30 seconds. Observe indicating thermometer reading at the instant forward flow stops.

(2) Record the indicating thermometer reading on the recorder chart.

Corrective Action.—Should the reading be below the minimum pasteurization temperature, the cut-in and cut-out mechanism and/or the differential temperature mechanism should be adjusted to obtain proper cut-in and cut-out temperatures by repeated tests. When compliance is achieved, seal the controller mechanism.

TEST 11. CONTINUOUS FLOW HOLDERS—HOLDING TIME

Reference.—Item 16p(B).

Application.—To all high-temperature short-time pasteurizers employing a holding time.

Frequency.—Upon installation and semiannually thereafter, whenever seal on speed setting is broken; any alteration is made affecting the holding time, the velocity of the flow (such as, replacement of pump, motor, belt, drive or driven pulleys, or decrease in number of HTST plates) or the capacity of holding tube; or whenever a check of the capacity indicates a speedup.

Criteria.—Every particle of milk shall be held for at least 15 seconds in both the forward and diverted flow positions.

Apparatus.—Electrical conductivity measuring device, Appendix I, (1) capable of detecting change in conductivity, equipped with standard electrodes; table salt (sodium chloride), 50-ml. syringe; stopwatch; suitable container for salt solution.

Method.—The holding time is determined by timing the interval for an added trace substance to pass through the holder. Although the time interval of the fastest particle of milk is desired, the conductivity test is made with water. The results found with water are converted to the milk flow time by formulation since a pump may not deliver the same amount of milk as it does water.

Procedure.—(a) Examine the entire system to insure that all flow promoting equipment is operating at maximum capacity and all flow impeding equipment is so adjusted or bypassed as to provide the minimum of resistance to the flow. There shall be no leakage on the suction side of the timing pump.

(b) Adjust variable speed pump to its maximum capacity (preferably with a new belt and full size impellers). Check homogenizers for seals and/or gears or pulley identification.

(c) Install one electrode at the inlet to the holder and the other electrode in the holder outlet. Close the circuit to the electrode located at the inlet to the holder.

(d) Operate the pasteurizer using water at pasteurization temperature, with flow-diversion valve in forward flow position.

(e) Quickly inject 50-ml. of saturated sodium chloride solution into the holder inlet.

(f) Start the stopwatch with the first movement of the indicator of a change in conductivity. Open the circuit to the inlet electrode and close the circuit to the electrode at the outlet of the holder.

(g) Stop the stopwatch with the first movement of the indicator of a change in conductivity.

(h) Record results.

(i) Repeat the test six or more times, until six successive results are within 0.5 seconds of each other. The average of these six tests is the holding time for water in forward flow. When consistent readings cannot be obtained, purge the equipment, check instruments and connections, and check for air leakage on suction side. Repeat tests. Should consistent readings not be obtained, use the fastest time as the holding time for water.

(j) Repeat steps (d) through (i) for testing time on water in diverted flow.

(k) With the pump at the same speed and equipment adjusted as in (a) above, time the filling of a 10-gallon can with a measured weight of water using the discharge outlet with the same head pressure as in normal operation. Average the time of several trials. (Since flow rates of the large capacity units make it very difficult to check by filling a 10-gallon can, it is suggested that a calibrated tank of considerable size be used.)

(l) Repeat procedure (k) using milk.

(m) Compute the holding time for milk from the following formula by weight, using the average specific gravity. Compute separately for forward flow and diverted flow.

Holding time for milk$=\frac{1.032(TMw)}{Ww}$ (by weight), in which—

1.032=specific gravity for milk;
T =average holding time for water;
Mw =average time required to deliver a measured weight of milk.
Ww =average time required to deliver an equal weight of water.

(n) Record results for office record.

Corrective Action.—When the computed holding time for milk is less than that required either in forward flow or diverted flow, the speed of the timing pump shall be reduced or adjustment made in the holding tube, and the timing test repeated until satisfactory holding time is achieved. Should an orifice be used to correct the holding time in diverted flow, there should be no excessive pressure exerted on the underside of the valve seat of the flow-diversion valve. Governors shall be sealed on motors that do not provide a constant speed as provided in item 16p (B) 5b.

APPENDIX J. SANITATION GUIDELINES FOR THE MANUFACTURE OF SINGLE-SERVICE CONTAINERS FOR MILK AND MILK PRODUCTS

The *Pasteurized Milk Ordinance* (Sec. 7, item 11p.) specifies that the health authority or an agency designated by him shall inspect the manufacturers' facilities, perform bacteriological tests, and make other examinations to determine the sanitary quality of the single-service articles expected to be in contact with milk and milk products. The inspection form (PHS–723–3), Appendix L, has been developed for use to call attention to areas, equipment, materials, and practices which may cause contamination of the milk and milk product containers during manufacture, packing, transportation, and handling of the single-service containers.

All paper, plastics, foil, adhesives, and other components of containers shall be free from deleterious substances and fulfill the requirements of the Federal Food, Drug, and Cosmetic Act as amended.

"Clean, sanitary stock" shall mean any plastic, foil, paper, and paperboard made from clean, sanitary, virgin materials, chemical or mechanical pulp or from broke, waste, or cuttings of such plastic, paper, and paperboard, providing they have been handled, treated, and stored in a clean, sanitary manner.

Disintegration tests on paper products and bacteriological analyses and rinse tests on plastic and paper products, when used to determine compliance with the criteria of item 12p of the *Grade A Pasteurized Milk Ordinance—1965 Recommendations of the United States Public Health Service*, shall be conducted in accordance with techniques described in *Standard Methods for the Examination of Dairy Products*. The sanitation of manufacturing plants and their surroundings shall be such as to protect all containers and component parts from dirt, grease, insects, and any other sources of contamination including insanitary handling.

A *Manual of Sanitation Standards for Certain Products of Paper, Paperboard, and Molded Pulp* has been prepared by the Syracuse University Research Corp., with the aid of a public-health advisory council, for the self-policing of that industry.

APPENDIX K. ADOPTION-BY-REFERENCE FORM OF THE GRADE A PASTEURIZED MILK ORDINANCE—1965 RECOMMENDATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE

(This short form is suggested for adoption by States, municipalities, and counties subject to the approval of the appropriate legal authority. Adoption of this form will reduce the cost of publishing and printing, and will enable the *Grade A Pasteurized Milk Ordinance* to be easily kept current. The adoption of this form is considered legal in many States and has been so adopted. The Council of State Governments has prepared a model State law, *Milk and Food Codes Adoption by Reference Act*,[a] which is recommended for enactment by States to enable communities to adopt milk and food ordinances by reference.)

An ordinance to regulate the production, transportation, processing, handling, sampling, examination, grading, labeling, and sale of milk and milk products, the inspection of dairy herds, dairy farms, and milk plants, the issuing and revocation of permits to milk producers, haulers, and distributors; and the fixing of penalties.

The ____________ of ____________[b] ordains:

SECTION 1. The production, transportation, processing, handling, sampling, examination, grading, labeling, and sale of all milk and milk products sold for the ultimate consumption within the ____________ of ____________[b] or its police jurisdiction; the inspection of dairy herds, dairy farms, and milk plants; the issuing and revocation of permits to milk producers, haulers, and distributors shall be regulated in accordance with the provisions of Part II of the *Grade A Pasteurized Milk Ordinance—1965 Recommendations of the United States Public Health Service*, a certified copy[c] of which shall be filed in the office of the appropriate official: *Provided*, That Sections 9, 16, and 17 of said unabridged ordinance shall be replaced, respectively by Sections 2, 3, and 4 below.

SECTION 2. From and after 12 months from the date on which this *Ordinance* is adopted, only Grade A pasteurized milk and milk products[d] shall be sold to the final consumer, or to restaurants, soda fountains, grocery stores, or similar establishments: *Provided*, That in an emergency, the sale of pasteurized milk and milk products which have not been graded, or the grade of which is unknown, may be authorized by the health authority; in which case, such milk and milk products shall be labeled "ungraded."

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[a] A copy of the model act is included in *Suggested State Legislation Programs for 1950*, developed by the Council of State Governments, 1755 Massachusetts Ave. NW., Washington, D.C.

[b] Substitute proper legal jurisdiction here and in all similar places throughout the *Ordinance*.

[c] A certified copy may be secured from the Department of Health, Education, and Welfare, Public Health Service, Washington, D.C.

[d] Communities wishing to provide for the sale of certified pasteurized milk should include such product in this section.

Note.—Certified pasteurized milk is derived from certified raw milk which meets the latest requirements of the American Association of Medical Milk Commissions, Inc., 405 Lexington Ave., New York, N.Y., 10017.

SECTION 3. Any person who shall violate any of the provisions of this *Ordinance* shall be guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not more than $--------, and/or such persons may be enjoined from continuing such violations. Each day upon which such a violation occurs shall constitute a separate violation.

SECTION 4. All ordinances and parts of ordinances in conflict with this *Ordinance*, shall be repealed 12 months after the adoption of this *Ordinance*, at which time this *Ordinance* shall be in full force and effect, as provided by law.

APPENDIX L. REPORTS AND RECORDS

The following field reports and office records have been developed for use with the *Grade A Pasteurized Milk Ordinance—1965 Recommendations of the United States Public Health Service:*

1. (PHS–723–1)—Milk Plant Inspection Report.
2. (PHS–1783)—Dairy Farm Inspection Report.
3. (PHS–723–2)—Milk Plant Equipment Tests Report.
4. (PHS–723–3)—Single-Service Milk Container Manufacturer Inspection Report.
5. (PHS–1782)—Milk Plant Inspection Record (including laboratory analyses and equipment test records).
6. (PHS–1784)—Dairy Farm Inspection Record (including laboratory analyses).

The attached reports and above office records may be purchased direct from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402. Sample copies of these forms may be obtained from the U.S. Public Health Service.

These forms may be reproduced, provided that credit is given to the U.S. Public Health Service, Department of Health, Education, and Welfare.

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**DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE**

DAIRY FARM INSPECTION REPORT

(Inspecting Agency)

NAME

LOCATION

Permit No.

Pounds Sold Daily

Plant

Sir: An inspection of your dairy farm has this day been made, and you are notified of the violations marked below with a cross (**X**). Violation of the same requirement on two successive inspections calls for permit suspension and/or court action.

COWS

1. Abnormal Milk:

Cows secreting abnormal milk milked last or in separate equipment (a)
Abnormal milk properly handled and disposed of (b)
Proper care of abnormal milk handling equipment (c)

MILKING BARN, STABLE, OR PARLOR

2. Construction:

Floors, gutters, and feed troughs of concrete or equally impervious materials; in good repair (a)
Walls and ceilings smooth, painted or finished adequately; in good repair; ceiling dust-tight (b)
Separate stalls or pens for horses, calves, and bulls (c)
Adequate natural and/or artificial light; well distributed (d)
Proper feed storage facilities (e)
Properly ventilated; no overcrowding (f)

3. Cleanliness:

Clean and free of litter (a)
No swine or fowl (b)

4. Cowyard:

Graded to drain; no pooled water or wastes (a)
Cowyard clean; cattle housing areas properly maintained (b)
No swine (c)
Manure stored inaccessible to cows (d)

MILKHOUSE OR ROOM

5. Construction and Facilities:

Floors

Smooth; concrete or other impervious material; in good repair (a)
Graded to drain (b)
Drains trapped, if connected to sanitary system (c)

Walls and Ceilings

Approved material and finish (a)
Good repair (windows, doors, and hose port included) (b)

Lighting and Ventilation

Adequate natural and/or artificial light; properly distributed (a)
Adequate ventilation (b)
Doors and windows closed during dusty weather (c)
Vents and lighting fixtures properly located (d)

Miscellaneous Requirements

Used for milkhouse operations only; sufficient size (a)
No direct opening into living quarters or barn, except as permitted by Ordinance (b)
Liquid wastes properly disposed of (c)

Cleaning Facilities

Two-compartment wash and rinse vat of adequate size (a)
Suitable water heating facilities (b)
Water under pressure piped to milkhouse (c)

6. Cleanliness:

Floors, walls, windows, tables, and similar non-product contact surfaces clean (a)
No trash, unnecessary articles, animals or fowl (b)
Pesticides and medicinals not stored in milkhouse (c)

TOILET AND WATER SUPPLY

7. Toilet:

Provided; conveniently located (a)
Constructed and operated according to Ordinance (b)
No evidence of human wastes about premises (c)
Toilet room in compliance with Ordinance (d)

8. Water Supply:

Constructed and operated according to Ordinance (a)
Complies with bacteriological standards (b)
No connection between safe and unsafe supplies; no improper submerged inlets (c)

UTENSILS AND EQUIPMENT

9. Construction:

Smooth, nonabsorbent, corrosion-resistant, nontoxic materials; easily cleanable; seamless hooded pails (a)
In good repair; accessible for inspection (b)
Approved single-service articles; not reused (c)
Strainers, approved design (d)
Approved CIP milk pipeline system (e)

10. Cleaning:

Utensils and equipment clean (a)

11. Sanitization:

All multi-use containers and equipment subjected to approved sanitization process (see Ordinance) (a)

12. Storage:

Left in treating chamber or sanitizing solution until used, or stored properly above floor (a)
Stored to assure complete drainage, where applicable (b)
Single-service articles properly stored (c)

13. Handling:

Sanitized milk contact surfaces not exposed to contamination (a)

MILKING

14. Flanks, Udders, and Teats:

Milking done in barn, stable, or parlor (a)

MILKING—Continued

Brushing completed before milking begun (b)
Flanks, bellies, udders, and tails of cows clean at time of milking; clipped when required (c)
Udders and teats treated with sanitizing solution and dried, just prior to milking (d)
No wet hand milking (e)

15. Surcingles, Milk and Anti-Kickers:

Clean; stored above floor in clean place (a)
Stools, easily cleanable construction and not padded (b)

16. Transfer and Protection of Milk:

Immediate removal to milkhouse or room (a)
Transfer, pouring, and/or straining facilities properly protected (b)

PERSONNEL

17. Hand-washing Facilities:

Soap, running water, and individual sanitary towels in milkroom and convenient to milking operations (a)
Wash and rinse vats not used as hand-washing facilities (b)

18. Personnel Cleanliness:

Hands washed clean and dried before milking, or performing milkhouse functions; rewashed when contaminated (a)
Clean outer garments worn (b)

COOLING

19. Cooling:

Milk cooled to 50° F. or less, within 2 hours after milking; maintained thereat until delivered (a)

VEHICLES

20. Vehicles:

Vehicles clean (a)
Constructed so as to protect milk (b)
No contaminating substances transported (c)

INSECTS AND RODENTS

21. Insect and Rodent Control:

Fly breeding minimized by approved manure disposal methods (see Ordinance) (a)
Manure packs properly maintained (b)
All milkhouse openings effectively screened or otherwise protected; doors tight and self-closing; screen doors open outward (c)
Milkhouse free of insects and rodents (d)
Approved pesticides; used properly (e)
Equipment and utensils not exposed to pesticide contamination (f)
Surroundings neat and clean; free of harborages and breeding areas (g)

Remarks:

Date

Sanitarian:

Note.—Item numbers correspond to required sanitation items for Grade A raw milk for pasteurization in the Grade A Pasteurized Milk Ordinance and Code—1965 Recommendations of the U.S. Public Health Service.

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DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

MANUFACTURING PLANT INSPECTION REPORT

SINGLE-SERVICE MILK CONTAINERS

....
(Inspecting Agency)

NAME ______________________________

LOCATION ______________________________

SIR: An inspection of your plant has this day been made and you are notified of the violations marked with a cross (X).

1. Buildings and Rooms:

All rooms of sufficient size for installation and maintenance of equipment ....(a)----

Fabricating room separate from nonproduction areas ....(b)----

Rodent-proof ....(c)----

2. Floors:

Smooth; impervious; in good repair ....(a)----

Clean; free of litter and unnecessary material and equipment ....(b)----

Joints between walls and floor tight ....(c)----

Trapped floor drains; no sewage backflow ....(d)----

3. Walls and Ceilings:

Clean; tight; in good repair ....(a)----

4. Doors and Windows:

No direct opening to living quarters ....(a)----

All outside openings effectively screened and/or otherwise protected to keep out insects, dust and airborne contamination ....(b)----

5. Lighting and Ventilation:

Adequate light (natural, artificial, or both) in all rooms—20-ft. candles in production areas and 4-ft. candles in storage areas ....(a)----

Ventilation sufficient to prevent excessive odors and condensation ....(b)----

6. Toilet Facilities:

All plumbing complies with State and local plumbing codes ....(a)----

Self-closing doors on toilet rooms ....(b)----

Clean; in good repair; free from flies ....(c)----

Well-lighted; ventilated to outside ....(d)----

7. Water Supply:

Safe; sanitary quality; source complies with State requirements ....(a)----

Distribution system complies with plumbing code ....(b)----

8. Handwashing Facilities:

Hot and cold or warm running water; soap; individual towels or air dryers provided ....(a)----

Clean; conveniently located in toilet facilities and convenient to fabricating areas ....(b)----

9. Storage of Finished Containers, Paper and Plastic:

On pallets 4" above floor and 12" from wall ....(a)----

Stored in clean, dry place, protected from splash, flies, dust, etc ....(b)----

Where containers are preformed, blanks stored in original cartons and sealed until used; partially used cartons resealed during storage ....(c)----

10. Locker and Lunch Rooms:

Separated from plant operations ....(a)----

Self-closing doors ....(b)----

Kept clean ....(c)----

Covered impervious trash containers readily accessible ....(d)----

11. Disposal of Wastes:

In public sewer or in sanitary manner in compliance with State and local plumbing codes ....(a)----

Refuse placed in covered, approved type containers ....(b)----

12. Surroundings:

Immediate surroundings in neat and clean condition ....(a)----

13. Miscellaneous Protection From Contamination:

Insects and rodents not present ....(b)----

No overhead contamination (dusty I-beams, sewer line leakage) ....(c)----

14. Personnel:

Clean hands ....(a)----

Clean outer garments and head coverings ....(b)----

No person with inadequately treated wound or lesion working in processing areas ....(c)----

15a. Preforming Equipment—Plastic Laminated Paper:

Mandrels and other contact surfaces cleaned and sanitized daily ....(a)----

All areas effectively shielded to prevent contamination where single-service containers are open ....(b)----

15b. Preforming Equipment—Wax Coated Paper:

Wax at proper level to completely coat container ....(a)----

All container contact surfaces clean ....(b)----

All areas where container is open, clean and container effectively shielded from contamination ....(c)----

15b. Preforming Equipment—Wax Coated Paper—Continued:

Machines, units, and appurtenances clean ....(d)----

15c. Preforming Equipment—Vacuum Formed, Blow Molded, and Extruded Plastic:

Contact surfaces kept clean ....(a)----

Containers effectively shielded from contamination ....(b)----

Machines, units, and appurtenances clean:

- Grinder ....(c)----
- Rollers ....(d)----
- Extruder and fittings ....(e)----
- Sheeting die ....(f)----
- Hopper at extruder ....(g)----
- Reamers and cutters ....(h)----

16. Equipment and Materials for Construction of Containers:

Plastic compounds, paper, and container components meet requirements of Food, Drug, and Cosmetic Act as amended and regulations issued thereunder ....(a)----

Plastic laminated paper and paperboard blanks from an approved fabricating plant ....(b)----

Paper and paperboard made of clean, sanitary stock ....(c)----

Sanitary lubricants used ....(d)----

17. Waxes, Adhesives, and Inks:

Stored in properly ventilated room ....(a)----

Unused wax slabs returned to storage ....(b)----

Slab wax stored on racks or pallets 4" above floor ....(c)----

Nontoxic waxes and adhesives ....(d)----

Tasteless and odorless wax and adhesives ....(e)----

Kept covered ....(f)----

Clean transfer containers ....(g)----

18. Handling of Containers and Equipment:

Handling of product contact surfaces minimal ....(a)----

19. Wrapping and Shipping:

Nested containers wrapped ....(a)----

Dust-free wrapper ....(b)----

Complete containers, blanks, closures, etc., protected from contamination prior to and during shipment ....(c)----

REMARKS:

DATE

SANITARIAN

NOTE.—This form has been developed for use with the Grade A Pasteurized Milk Ordinance—1965 Recommendations of the U.S. Public Health Service.

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DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

MILK PLANT INSPECTION REPORT

(Including Receiving Stations,[1] Transfer Stations,[2] and Bulk Tank Cleaning Facilities [3])

185

....
(Inspecting Agency)

NAME ____________________

LOCATION ____________________

POUNDS SOLD DAILY

Milk .... ________
Other Milk Products . ________
TOTAL .... ________
Permit No. .... ________

SIR: An inspection of your plant has this day been made, and you are notified of the violations marked with a cross (X). Violation of the same requirement on two successive inspections calls for permit suspension and/or court action.

1. Floors:
Smooth; impervious; no pools; good repair; trapped drains.............(a)....
2. Walls and Ceilings:
Smooth; washable; light-colored; good repair..(a)....
3. Doors and Windows:
All outer openings effectively protected against entry of flies and rodents.............(a)....
Outer doors self-closing; screen doors open outward.............(b)....
4. Lighting and Ventilation:
Adequate light in all rooms (see Ordinance)....(a)....
Well ventilated to preclude odors and condensation; filtered air with pressure systems.........(b)....
5. Separate Rooms:
Separate rooms as required; adequate size.......(a)....
No direct opening to barn or living quarters.....(b)....
Storage tanks properly vented.............(c)....
6. Toilet Facilities:
Complies with local ordinances.............(a)....
No direct opening to processing rooms; self-closing doors.............(b)....
Clean; well-lighted and ventilated; proper facilities.............(c)....
Sewage and other liquid wastes disposed of in sanitary manner.............(d)....
7. Water Supply:
Constructed and operated in accordance with Ordinance.............(a)....
No direct or indirect connection between safe and unsafe water.............(b)....
Condensing water and vacuum water in compliance with Ordinance requirements..........(c)....
Complies with bacteriological standards..........(d)....
8. Hand-washing Facilities:
Located and equipped as required; clean and in good repair; improper facilities not used.....(a)....
9. Milk Plant Cleanliness:
Neat; clean; no evidence of insects or rodents; trash properly handled.............(a)....
Approved pesticides; safely used.............(b)....
10. Sanitary Piping:
Smooth, impervious, corrosion-resistant, nontoxic, easily cleanable materials; good repair; accessible to inspection.............(a)....
Cleaned-in-place lines meet Ordinance specifications.............(b)....
Pasteurized products conducted in sanitary piping, except as permitted by Ordinance.......(c)....
11. Construction and Repair of Containers and Equipment:
Smooth, impervious, corrosion-resistant, nontoxic, easily cleanable materials; good repair; accessible to inspection.............(a)....
Self-draining; strainers of approved design.....(b)....
Approved single-service articles; not reused.....(c)....
12. Cleaning and Sanitizing of Containers and Equipment:
Containers, utensils, and equipment effectively cleaned.............(a)....
Mechanical cleaning requirements of Ordinance in compliance; records complete.............(b)....
Approved sanitization process applied prior to use of product-contact surfaces.............(c)....
Required efficiency tests in compliance..........(d)....
13. Storage of Cleaned Containers and Equipment:
Stored to assure drainage and protected from contamination.............(a)....
14. Storage of Single-Service Articles:
Received, stored and handled in a sanitary manner; paperboard containers not reused......(a)....
15. Protection From Contamination:
Operations conducted and located so as to preclude contamination of milk, milk products, ingredients, containers, equipment, and utensils.............(b)....
Overflow, spilled and leaked products or ingredients discarded.............(b)....
Air and steam used to process products in compliance with Ordinance.............(c)....
16a. Pasteurization—Batch:
(1) Indicating and Recording Thermometers:
Comply with Ordinance specifications.............(a)....
(2) Time and Temperature Controls:
Adequate agitation throughout holding; agitator sufficiently submerged.............(a)....
Each pasteurizer equipped with indicating and recording thermometer; bulbs submerged.....(b)....
Recording thermometer reads no higher than indicating thermometer.............(c)....
Product held minimum pasteurization temperature continuously for 30 minutes, plus filling time if product preheated before entering the vat, plus emptying time if cooling is begun after opening outlet.............(d)....
No product added after holding begun..........(e)....
Airspace above product maintained at not less than 5.0° F. higher than minimum required pasteurization temperature during holding.....(f)....
Approved airspace thermometer; bulb not less than 1 inch above product level.............(g)....
Inlet and outlet valves and connections in compliance with Ordinance.............(h)....
16b. Pasteurization—High-Temperature, Short-Time Continuous Flow:
(1) Indicating and Recording Thermometers:
Comply with Ordinance specifications.............(a)....
(2) Time and Temperature Controls:
Flow diversion valve complies with Ordinance requirements; diverted flow line self-draining; stoppage precluded; proper assembly and operation; product held minimum pasteurization temperature.............(a)....
Recorder-controller complies with Ordinance requirements; recorder temperature no higher than indicating thermometer temperature; cut-in and cut-out temperature at or above 161° F.; setting sealed; no bypass around sensor; sensor located properly.............(b)....
Holding tube complies with Ordinance requirements; proper design and assembly; no short circuiting; proper slope and supports..........(c)....
Flow promoting devices comply with Ordinance requirements; no improper manual switches; maximum speed assures 15-second hold; setting sealed as required; proper location..........(d)....
(3) Adulteration Controls:
Satisfactory means to prevent adulteration with added water.............(e)....
16c. Pasteurization—Milk-to-Milk Regenerative Heating:
Pasteurized milk in regenerator automatically under greater pressure than raw milk in regenerator at all times.............(a)....
Accurate pressure gages installed as required; booster pump properly identified.............(b)....
16d. Pasteurization—Temperature Recording Charts:
Batch pasteurizer charts comply with applicable Ordinance requirements.............(a)....
HTST pasteurizer charts comply with applicable Ordinance requirements.............(b)....
17. Cooling of Milk:
Raw milk maintained at 50° F. or less until processed.............(a)....
Pasteurized milk and milk products, except those to be cultured, cooled immediately to 45° F. or less in approved equipment; all milk and milk products stored thereat until delivery..........(b)....
Approved thermometer properly located in all refrigeration rooms and storage tanks.........(c)....
Recirculated cooling water from safe source and properly protected; complies with bacteriological standards.............(d)....
18. Bottling and Packaging:
Performed in plant where contents finally pasteurized.............(a)....
Performed in sanitary manner by approved mechanical equipment.............(b)....
19. Capping:
Capping and/or closing performed in sanitary manner by approved mechanical equipment.....(a)....
Imperfectly capped/closed products properly handled.............(b)....
Sanitary cap and/or closure.............(c)....
20. Personnel—Cleanliness:
Hands washed clean before performing plant functions; rewashed when contaminated.......(a)....
Clean outer garments worn.............(b)....
No use of tobacco in processing areas..........(c)....
21. Vehicles:
Vehicles clean; constructed to protect milk.....(a)....
No contaminating substances transported.........(b)....
22. Surroundings:
Neat and clean; free of pooled water, harborages, and breeding areas.............(a)....
Tank unloading areas properly constructed.......(b)....
Approved pesticides, used properly.............(c)....

REMARKS:

DATE:

SANITARIAN:

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[1] A receiving station shall comply with Items 1 to 15, inclusive, and 17, 20, and 22. Separation requirements of Item 5 do not apply.

[2] A transfer station shall comply with Items 1, 4, 6, 7, 8, 9, 10, 11, 12, 14, 15, 20, 22, and as climactic and operating conditions require, applicable provisions of Items 2 and 3. In every case, overhead protection shall be required.

[3] Facilities for the cleaning and sanitizing of bulk transport tanks shall comply with the same requirements for transfer stations.

NOTE.—Item numbers correspond to required sanitation items for Grade A pasteurized milk in the Grade A Pasteurized Milk Ordinance—1965 Recommendations of the U.S. Public Health Service.

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DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

MILK PLANT EQUIPMENT TESTS REPORT

TEST NO.	TEST	FREQUENCY (In addition to initial test)	SEE ORDINANCE PAGE	TEST MADE (✓)	IDENTITY OF EQUIPMENT AND RESULTS OF TEST
1	Indicating thermometers (including air space thermometers): Temperature accuracy.	Quarterly	154		
2	Recording thermometers: Temperature accuracy	Quarterly, and when frequent adjustments necessary.	155		
3	Recording thermometers: Time accuracy	Quarterly	156		
4	Recording thermometers: Checked against indicating thermometer	Quarterly (daily by operator)	156		
5	Flow diversion valve: Proper assembly and function	Quarterly	157		
	A. Leakage past valve seat		157		
	B. Operation of valve stem		157		
	C. Valve assembly		157		
	D. Manual diversion		158		
	E. Response time		158		
6	Leak-protector inlet, outlet, and diversion valves: Leakage	Quarterly	158		
7	Indicating thermometers on pipelines: Thermometric response	Quarterly	159		
8	Recorder-Controller: Thermometric response	Quarterly	159		
9	Setting of controls: Regenerator pressures	Quarterly; after any change in booster pump or switch circuit, and/or whenever switch seal is broken.	160		
	A. Pressure switches used to control operation of booster pumps.		160		
	B. Time delay switches used to control operation of booster pumps.		161		
	C. Pressure gages: Accuracy	Quarterly; and following repair or adjustment.	162		
10	Milk-flow controls: Cut-in and cut-out temperatures	Quarterly (daily by operator)	162		
11	Continuous flow holders: Holding time	Semi-annually; and whenever any alteration is made.	163		

REMARKS:

PLANT	LOCATION	DATE	SANITARIAN

NOTE.—This form is a supplement to the Milk Plant Inspection Report PHS-723-1, and these tests are in addition to the equipment requirements for which compliance is determined by inspection. See Appendix I, Grade A Pasteurized Milk Ordinance—1965 Recommendations of the U.S. Public Health Service.

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